# Leaks and Losses

By JOHN A. KAGERHUBER, Ch. Engr.

I HAVE gathered some data on leaks and losses in paper and pulp mills, which perhaps will be of interest to many of the manufacturers, since it is necessary in these times of keen competition to operate a mill very efficiently in order to compete with foreign intruders in our trade, and still make a fair margin of profit. These items may set many to thinking about their own mill, buildings, equipment, etc.

**Buildings, Equipments, Tools, etc., and care of same.**

1. Failure to keep up proper repairs.
2. Lack of sufficient or too much floor space for character of work.
3. Lack of trucking facilities (motor trucks, etc.).
4. Insufficient or too much lubrication.
5. Not knowing exact location of fire equipments, lack of fire drill.
6. Attempting fine work with poor grade of tools.
7. Doing work by hand that could be more economically done by machinery.
8. Equipment out of date.
9. Lack of sufficient room for goods in process and for finished goods.
10. Lack of adequate equipment.
11. Tools not properly designed or constructed.
12. Insufficient conveniences for sanitation, drinking water, etc., causing loss of time.
13. Insufficient fuel or power.
14. Idle equipment.
15. Bad ventilation and wrong temperature.
16. Burning lights, running water and letting motors run when not needed.
17. Lack of sufficient elevators and stairways to take care of traffic.
18. Not having some person who is responsible for upkeep and care of buildings, etc.
19. Telephone placed too far from those who use it the most.
20. Lack of regular place to keep tools.
21. Poor arrangement of machinery allowing vacant space.
22. Machinery not running to full capacity of speed.
23. Improper lighting, causing bad work.
24. Improper tools for repairing machinery.
25. Insufficient fire protection.
26. Floors not firm enough, causing too much vibration and wear on machinery.
27. Department not arranged consecutively.
28. Overloaded upper floors.
29. Leaks in water pipes.
30. Flimsy wooden partitions.
31. Inflammable material lying around.

**Management or supervision.**

1. Hiring incompetent men.
2. Too quick firing a man.
3. Not planning flow of work so as to keep men and machines supplied.
4. Lack of proper standards in setting or maintaining piece rates.
5. Not investigating causes of absentees or tardiness.
6. Lack of sufficient leadership or placing of irresponsible men as heads of departments.
7. Not keeping close co-operation between departments—e. g., production and selling.
8. Lack of co-operation between management and employees.
9. Being too familiar with the employees.
10. Keeping a man on a job after repeated failure.
11. Having more men on a job than necessary.
12. Lack of records of spoiled work—as to causes and persons responsible.
13. Allowing workmen to be careless, by permitting a condition that allows workmen in one department to wait on work from another.
14. By shifting workmen from one kind of work to another.
15. Not planning work far enough in advance.
16. Loss of time in teaching new men.
17. Improper assignment of tasks—e. g., putting a 35c man on work that a 12½c boy could do as well.
18. Not placing men on work for which they are especially fitted.
19. Not having records as to how work is done, in each operation.
20. Using verbal instead of written orders.
21. Not making orders or instructions clear.
22. Having records that are not easily accessible.
23. Letting orders get in shop without going through office.
24. Orders issued to departments after work is completed—shows lack of planning.
25. Not getting confidence of employees by having them come with questions concerning work, and thereby eliminating many errors.
26. Employing poor class of workmen for heavy work sometimes causes breakages, causing shortages of material and holding up production.
27. Not having understudies to take up the work when the men higher up are promoted to better positions.
28. Poor workmanship due to careless supervision.
29. Having wrong theory of manufacturing. Some operate on the theory of getting out a number of units some weeks instead of at the rate of a number of units each week. There is a decided difference between the two theories. The for-

mer might mean a few units at the beginning of the week and a load at the end of the week, causing night and Sunday work to finish the week's quota.

30. Having foremen who do not know how to handle men the best, easiest and quickest way.
31. Inefficiency of management. Inefficiency beyond the control of the workmen is something to be watched closely.
32. Keeping inefficient employees on the payroll.
33. Too large or too small advertising appropriation.
34. Too many people detailed to do the same things.
35. Postponement of necessary things.
36. Tendency to criticise unnecessarily.

**Working Force.**

1. Absences caused by some form of dissipation or excessive pleasure over week end.
2. Having discontented workmen.
3. Workers taking tools and supplies from tool room without authority and not returning them.
4. Upsetting department by getting more supplies than is required for one job.
5. Visiting other departments needlessly.
6. Loss of time awaiting work, foreman or inspector.
7. Not working close enough to specifications.
8. Petty pilfering of tools, materials, etc.
9. Neglecting to report shortage of materials at once.
10. Transacting personal business during working hours.
11. Getting to work late and leaving early.
12. Foreman or high priced men doing work which might be done by subordinates.
13. Girls on day work loafing, not turning out as much work as they are capable of doing.
14. Neglecting work on machines, causing bad workmanship.
15. Improper handling of work, allowing it to become soiled.
16. Piece workers keeping production at a certain amount when they are able to turn out more work.
17. Waste in use of materials.
18. Inefficient methods.
19. Lack of loyalty to employer.
20. Idling on the job—due to
    1. Carelessness.
    2. Laziness.
    3. Poor ventilation.
    4. Insufficient amount of work.
    5. Lack of pride.

**Sales Force.**

1. Lack of courtesy.
2. Lack of initiative.
3. Lack of adequate records sent to house.
4. Not properly placed correspondence and visits to customers after inquiries are received.
5. Lack of proper training of salesmen.
6. Salesmen not taking proper care of health.
7. Salesmen that do not make some report of selling conditions in their territory.
8. Badly arranged territories, wasting time and money.
9. Large expense accounts.
10. Covering territory too fast or too slow.
11. Failure to secure order on first visit.
12. Inaccuracy in quoting prices.
13. Failure to secure well balanced orders, representative of line.
14. Failure to keep good will of customer.
15. Lack of interest in goods to be sold.
16. Ignorance of customer's needs.
17. Carelessness of personal appearance.

**Sales Department.**

1. Not keeping in close touch with salesman.
2. Deviating from policy "One price to all."
3. Not furnishing salesman with all facts pertaining to good points of product.
4. Lack of W. S. P. I.
5. Not teaching salesmen how and when to close.
6. Uninteresting letters to customers and salesmen.
7. Not planning trips and salesmen.
8. Lack of adequate follow up system.
9. Lack of knowledge of competing lines.
10. Failing to develop new fields for product.
11. Keeping standard product to suit wishes of customer.
12. Lack of proper effort of salesman to sell standard line, thus increasing cost of production.
13. Lack of proper training of sales department in fundamentals of different sales languages.
14. Lack of testing out different sales campaigns before operating on larger scale.
15. Lack of proper records.
16. Inaccuracy in keeping records.
17. Failure to make full use of records.
18. Careless inspection of orders received.
19. Lack of co-operation between sales department and sales force.
20. Failure to observe customer's viewpoint.
21. Overselling some numbers—overstocked.

**Advertising Department.**

1. Lack of co-operation with sales department in not advertising in district worked by salesmen.
2. Advertising locally when goods are sold outside in territory.
3. Poor judgment in selecting of mediums.
4. Not doing enough.
5. Lack of preparation of copy and schemes.
6. Lack of originality.
7. Large expenditure—small return.
8. Lack of proper ratio between amount of advertising assistance offered by the manufacturer and the business received from the customer.
9. Unattractive literature.
10. Poor distribution of advertising matter.

11. Exaggeration in advertising.
12. Lack of knowledge of goods.
13. Lack of proper records and data.
14. Misrepresentation.
15. Advertising a class of goods not suited to condition of territory.

**Buying and Receiving.**

1. Overstocking.
2. Underbuying.
3. Not getting competitive bids or prices.
4. Not ordering soon enough to prevent rush express shipments.
5. Not having goods on hand when needed.
6. Not checking as to specifications.
7. Goods not put in stock room when received.
8. Not keeping records of goods received.
9. Not marking B/L as to damaged goods.
10. Buying in small lots, or from hand to mouth, instead of getting quantity prices.
11. Buying poor grade material for high class work.
12. Lack of standards as to amount of material required in various departments.
13. Overbuying.
14. Not checking goods with invoice.
15. Not putting in claim for damaged goods.
16. The purchasing department failing to specify where material ordered is to go other than for stock, causing loss of time for stock keeper.
17. Not having proper records of express, freight or carriage cost of goods that should be billed to customer.
18. Insufficient knowledge of values and correct prices.
19. Goods not given proper care when received.
20. Buying because of friendship, regardless of cost.
21. Not being posted on market prices and values.
22. Failure to state how all goods are to be shipped.

**Shipping Department.**

1. Incomplete filing of orders.
2. Errors in filing of orders or directing shipment.
3. Insufficient packing.
4. Bad handling of goods.
5. Lack of records—showing:
    1. Goods shipped.
    2. Orders partly filled.
    3. Substitutions—Why?
    4. Notice to sales department.
6. Making a poor unwise substitute.
7. Not carefully routing a shipment.
8. Improper or utter lack of labeling.
9. Not utilizing car space properly.
10. Demurrage bills.
11. Not loading and unloading promptly.
12. Packing cases poorly designed.
13. Sending long time orders by express.
14. Wrong classification.
15. Inefficient trucking.
16. Delayed shipments—failure to ship when promised is always detrimental to success. A reputation for prompt delivery of every concern and the rule is to watch this in order to retain the good-will of the trade.
17. Shipments of small lots causing extra carriage charges.
18. Deterioration of goods on shelves.
19. Packing goods in cases and not checking on order.
20. Marking cases incorrectly.
21. Not shipping as requested by customers.

**Accounting Department.**

1. Not checking up on long runs at once, thereby resulting in a big loss that could have been stopped.
2. Some time is lost the accounting department because time cards are not made out properly before coming to the department.
3. Sometimes the accounting department is not given orders for material and therefore cannot figure cost, and much time is lost because they are not able to get the proper information.
4. Inadequate cost records.
5. Inaccurate or incomplete cost systems are due to various things, one being that they have failed to keep them up to date, causing losses by failing to make alterations in cost sheets to compensate for large increase in both raw material and labor.
6. Failure to add sufficient overhead.

**Dealings with Customers.**

1. Adopting the policy "Customers are always wrong" instead of "Customers are always right."
2. Failure to keep promise made as to quality, price and date of shipment.
3. Failure to send B/L invoice at time of shipment.
4. Failure to comply with customer's instructions as to routing, marking, etc.
5. Selling concerns with doubtful credit.
6. Give too long a dating on bills.
7. Failure to answer correspondence.
8. Shipping of much inferior grade than customers ordered, which necessitates re-shipment and postpones receipt of purchase price from customers.
9. Lack of standard policy for dealing with trade, causes a loss of business.
10. Lack of adequate and reliable records of all dealings and correspondence with customers.
11. Not giving attention to shortages and other complaints at the proper time.
12. Failure to adjust for all claims.
13. Not being able to check shortages reported.
14. Not exercising care in regard to discount.

**Production.**

1. Bad handling of goods between departments.
2. Goods ready for shipment held in stock room too long.
3. Poor system of inspection.

4. Allowing goods, not up to standard, to go into stock.
5. Lack of W. S. P. I.
6. Lack of discipline shown in workmen starting work late and quitting early.
7. Inferior workmanship.
8. Defective work not found until passed through several operators—Improper inspection.
9. Lack of standards.
10. Lack of sufficient help in certain departments, and unblamable force.
11. Loss of time in getting machines ready too many times a day—lack of planning.
12. Careless handling.
13. Materials not coming in at same rate of production, sometimes causes delay in handling, if coming in too late.
14. A man who is worth 40 to 50 cents an hour going to stock room for supplies, when a boy worth 20 cents will eliminate many such trips and tend to increase production, including men and machines.
15. Turning out poor work that will be rejected; rejected work is waste of the worst kind, and to eliminate this waste will mean a greater production.
16. Failure to get orders from shop as to orders wanted first and failure to get this information at the right time.
17. Much time is lost in frequent inventories, when a permanent inventory should be kept. Lack of production causes failure to plan and schedule a day's work ahead.

**Material.**

1. Raw—Through lack of standards.
2. Worked—Poor system of transferring between departments. Loss through lack of standards. Scrapping spoiled materials instead of using on other work. Loss through lack of schedules showing how material is to be utilized with least waste.
3. Finished—Not using surplus material. Leaving barrels, boxes and containers in scrap heap at the mercy of the elements, instead of collecting and selling it.
4. Faulty work due to material—Managers fail to realize how easy it is to waste money improving material. The loss is greater than is appreciated.

**Goods themselves.**

1. Poor designing.
2. Bad workmanship.
3. Many times could substitute cheaper grade material, spoilage or both.
4. Overproduction of models.
5. Change in operation or half schedules when changes are necessary in the tasks set before the men; the real reason should be investigated in order to reduce if possible to a minimum.
7. Obsolete styles.

**Administration.**

1. Lack of standardized conditions and operations in handling and routing mail.
2. Sometimes some of the stenographers and clerks are crowded with work, while others do not have enough, showing lack of planning on the part of the office manager.
3. Lack of adequate records in every department.
4. Not keeping records easily accessible—causing much loss of time searching for records that should be available.
5. Not having equipment to facilitate the work, as card indexes, etc.

# Effect of Seasonal Temperature on Paper Making

By W. A. WYLDE

EVERY paper mill superintendent knows from long experience that as the seasons change from one to another he meets variations in paper mill operations. He does not have to watch the calendar to know that summer is coming for he has already felt it at the mill. His great aim is to prevent the paper he makes from showing up these seasonal changes.

It is the purpose of this article to explain the effect of such seasonal temperature changes, to show how they affect the paper making processes, and the qualities of paper, and to indicate methods of neutralizing their effects. To do this let us compare mid-summer and mid-winter conditions on the manufacture of rag content bond papers, realizing that the same principles hold true for all classes of papers.

## Water Temperatures

The effect of the seasons is felt principally in the temperature of the water used in the paper mill. Some mills are fortunate in their water supply in that the water is obtained from deep wells or from the bottoms of deep ponds and is so piped to the mill that temperature changes with the seasons are not great. It is not unusual for such mills to enjoy water temperatures of 40° F. in the winter and 55° F. in the

summer. The word enjoy is used advisedly, for such mills are fortunate indeed to have only a fifteen degree variation from winter to summer. Other mills, obtaining water from shallow ponds or from rivers, have a water temperature of 32° F. in the winter and as high as 80° F. in the summer. These mills are unfortunate, for the temperature variation of forty-eight degrees is the indirect cause of many of their troubles.

## Stock Preparations

It is in the beater room that most of the troubles due to temperature variations are felt. As we all know the three principal things which happen to the fibres in the beaters are—

1. The fibres are cut lengthwise.
2. The fibres are crushed, split and bruised.
3. The fibres are hydrated: which is to say that water combines with the cellulose and causes the fibres to swell, to become "greasy" or slippery, and to become transparent.

It is probable that (2) and (3) are quite dependent upon each other, for the more a fibre is crushed and split the more surface does it expose to the action of the water and consequently the faster will it become hydrated. For the purposes of this discussion, therefore, let us look upon the beating action as having chiefly two effects, namely cutting and hydration.

The ratio between the amount of cutting and the amount of hydration (assuming that these can be qualitatively measured) may vary greatly depending on the type, design and condition of beater tackle (flybars and bedplates), the speed of circulation of stock in the beaters, the furnish (including thickness or density of the stock), the setting of the roll, the time of beating, and the temperature of the stock.

Of course for a given beater line the type of beater tackle is kept constant as well as the design of the angles of the bedplate, and the condition of the tackle is carefully watched and replacements made when necessary. Moreover, most mills have standardized the furnish for each grade of paper, in many cases including the amount of water used, which gives a fairly constant density and should insure a reasonably constant circulation rate in the beaters. Some mills even go so far as to standardize the time of beating of a given grade of paper. Thus the beater engineer is allowed to vary only the setting of the roll in order to produce a stock which will run uniformly on the paper machine and make a uniform paper. Even if the mill is not highly standardized, such things as beater equipment, furnish and circulation rate are largely beyond the engineer's control to vary as he pleases, and oftentimes in order to avoid shutting down the paper machine or changing its speed, the beating time must be shorter or longer than he desires. In effect then, he has one variable (the setting of the beater roll) under his control which he can use to overcome unavoidable variations in other conditions and furnish a uniformly beaten stock to the paper machine.

Most paper mills, in addition to beating engines, have Jordans or Marshall Engines to further refine the stock. These engines are not essentially different from a beating engine. The stock goes through them much quicker than through a beating engine, but is treated much more harshly while it is in them. It is not correct to say that a beating engine hydrates the fibres, while a refining engine cuts them. Both engines cut and both hydrate, the degree of each action depending on the design of the engine and on the way it is used. If the beating engine be provided with sharp steel tackle, and with bedplate so designed as to make a sharp cutting angle with flybars, and the stock circulated at a low density, it could probably be made to cut stock more and hydrate it less than a refining engine equipped with wide, bronze or carborundum filling working on heavy, high density stock. Certainly this could be done if the stock going through the beating engine were heated by adding steam. (Although he has never seen them, the writer believes it to be a fact that refining engines operating as above have even replaced beating engines in the manufacture of glassine papers, where the stock is so hydrated as to be almost fibreless.)

By the very nature of things, however, the refining engine cuts more than it hydrates in respect to the beating engine. Stock going through a Jordan is usually lighter than that used in the beater, due to the addition of water in dumping the beater, while it is always at a higher temperature than the average temperature of the stock in the beaters, for the stock is always increasing in temperature during beating and refining.

This indicates one more variable at the hands of the beater engineer, for assuming that he is required to furnish stock of a given fibre length to the machine, he can make it more or less hydrated or "greasy" by doing more or less of this work in the beaters. Again he is limited in the use of this control, however, by the capacity and power of his refining engine, and by the necessity of reducing the stock in the beaters to a point at least where it will not plug the refining engine.

## Temperature Effect on Stock Preparation

All this is apparently far afield from the purpose of this article as indicated by its title. Except for a few references the preceding paragraphs have scarcely mentioned the effect of varying temperatures of water. It will be remembered, however, that the temperature of the stock was mentioned as one of the important variables in beating not ordinarily within the control of the beater engineer. The reason is simple. Heating hinders hydration, so that if two beaters exactly the same, were filled and beaten alike except that the stock in one was at 32° F. while the stock in the other was 80° F. there would be a tremendous difference in the character of the

stock. The stock in each would be cut to about the same degree, but the cold beater would be much more "greasy" or hydrated. And if these two stocks were run on the paper machine they would have to be handled differently and would make different paper, even though the cold stock were heated up to the temperature of the other in the head box of the paper machine.

This is exactly the thing that causes the superintendent to know that summer is coming, for he sees what the beater engineer does in an endeavor to prevent the changing water temperature from changing the character of the stock. Let us suppose the beater engineer is not entirely successful, because conditions are so bad as to be more than he can correct. Then the superintendent is sure that summer is coming for he can see it in his paper. Anyone or all of the following troubles may occur.

## Sizing

Perhaps the super comes into the mill the morning after a hot day and night and writes on a piece of paper just made. To his horror he discovers that the ink feathers and spreads. He is in for a spell of sizing trouble. Why? Because the stock is not hydrated enough to hold the size, for "free" or insufficiently hydrated stock does not hold size as well as "slow" stock. Not being held so well, the size is lost in the foam which is so apt to give trouble in hot weather, or is sucked off the wire side of the sheet by the suction boxes and the suction roll. He adds more size, throws additional alum into the beaters, increases the strength of his tub size bath, increases the beating time, and finally if all other methods fail, slows down the machine so that the beating time can be lengthened further. Slowing down the machine in itself is a help, for the slower the speed the more water drains out of the stock naturally on the wire and less is therefore sucked out by the suction. It is the rush of water out of the stock by suction which carries away the size, and the more water that drains off naturally, the less size will be lost by the suction. There are thus two opposing factors, for the more hydrated the stock is the better will it hold size, while on the other hand, the more water will be carried down to the suction boxes with resultant greater loss of size by suction. However, the first of these factors is the more important and the remedy is therefore to hydrate the stock well, and then, if necessary, to slow down the machine to give this slower stock an opportunity to drain better on the wire.

In addition to the above effect on sizing, the temperature of the stock has another effect. The higher the temperature of the stock when the size is precipitated by the alum, the larger will be the particles of the precipitated size and these larger particles are not held as well by the fibres, nor do they have as high a covering power. There are on the market starch products which are sold as an addition agent to be put into the size before it is added to the beaters. These products are of considerable value, for they act to prevent the coagulation of the precipitated size into large particles.

## Other Qualities

Again it may be that the summer troubles are due to two sidedness of colored papers. The explanation of this is the same as for the sizing, that colors are held by well hydrated fibres better than by "free" fibres. The best remedy for this trouble is to use direct colors as much as possible, for direct colors are set into the fibres by heat, which neutralizes the tendency toward two-sidedness due to too "free" stock. Otherwise the only remedy is to increase beating time, slow down the machine, or both.

There are other summer troubles caused by too free stock, for with free stock it is difficult to obtain a clear watermark, the bursting strength of the paper is apt to drop, and the general snap or tone of the sheet is liable to fall off. All these troubles can be remedied only by increasing the hydration of the fibres.

## Production

It must not be supposed that after September has passed the superintendent's life becomes a beautiful dream, with nothing to worry about until the following summer. Bad winter conditions worry him also. In the winter he has troubles characteristic of "too" slow stock. The first is production. The stock must be cut short enough so that it will screen well and will form or felt well on the wire. In so doing, however, it must not be hydrated too much, or the water will not drain out well on the wire. Fibres cannot be cut without being hydrated, and it is therefore difficult to carry out the beating so as to give stock "free" enough. Otherwise the machine must be slowed down so that a longer, less hydrated stock can be used. Or it may be that drying capacity will limit production in the winter, for the slower the stock the harder does it dry. Winter is the season when the steam costs mount to the skies, and although the superintendent in this season can economize on rosin and tub size, this will nowhere nearly pay for his extra steam.

## Lofts and Calenders

Winter, like summer, also has its effects on quality. Naturally these are generally the antithesis of the summer troubles. The loft foreman is apt to greet the superintendent with a statement that the paper is curling badly in the loft so that his men cannot jog it. The sheet calender foreman is liable to complain of the edges being hard and curly so that the corners turn over and the broke increases, or he may complain that the surface is so cockled that he cannot smooth it out to match the sample without getting the paper too glossy.

These troubles are caused by the paper being too hard. The one general remedy, of course, is to "free" the stock. Aside from this the loft troubles can probably be helped somewhat by slower drying with lower temperature, and by careful seasoning, and the calender conditions can be improved by the same remedy and by heating the paper to about 100° F. before calendering. The cockle will be lessened by drying the paper down as dry as possible before tub sizing and by running with the wet press draws as tight as possible.

The main remedy for the winter troubles is, as has been said, to free the stock. This can be helped by lighter beating and by as much work in the Jordan as possible. Aside from this the only remedy is to heat the stock in the beaters, not to a point where summer troubles will return but to a point representing a happy medium. This is expensive, however, as it costs about 85 cents to heat a beater of stock from 32° F. to 60° F., the beater containing 1,500 pounds stock at 5% density and steam costing $1.00 per 1,000 pounds.

## Moisture In Paper

The above remarks have applied to the making department of the mill, except in the single instance of the sheet calenders. The seasonal changes also affect the finishing department.

In the summer the atmosphere is warm and often very humid. Paper exposed to a wet humid atmosphere picks up moisture and sometimes in summer it is apt to contain as high as 10% moisture. When such paper is calendered it is apt to gloss and blacken. As a general rule, however, the summer conditions are not bothersome in the finishing room, for most of the time the paper will be held at 6-7% moisture, which is ideal.

In the winter, however, cold air is taken from outside and heated inside the mill so that it becomes very dry indeed. Paper stored in the finishing room therefore contains very little moisture, in some cases not as much as 4%. This dry paper is troublesome, for static electricity is generated wherever it is handled, which causes trouble, particularly on the platers, due to the paper sticking to the linens with consequent low production, high broke, and high linen costs.

The variation of the moisture content in the finished paper from day to day makes it impossible to tell just what weight to run paper on the machine in order that it may be shipped at a given baseweight. An order of paper run exact weight and leaving the machine with 4% moisture might pick up an additional 4% before shipping so that it would be shipped 4% heavy with a consequent loss to the mill, for the customer does not pay for this weight above the nominal baseweight. On the other hand, in the winter the paper might lose enough moisture so that it is shipped under the nominal weight, which means a rebate to the customer and in addition perhaps a strenuous complaint from him.

The remedy for these finishing room troubles is to install a ventilating system which automatically furnishes air at a definite humidity and temperature into the room. Such a system operates very satisfactorily except that on the hottest days of the summer, unless an expensive refrigerating system is installed, it cannot furnish air both moderately dry and cool. It does, however, operate well in the winter, doing away with the troubles due to too dry papers and assures that the moisture in the paper is kept reasonably constant throughout the year, thus allowing close control of the shipping weights.

## Conclusion

It will be seen that unless a mill is fortunately situated with regard to climatic conditions, or is fortunate with regard to its water supply, the variation in its operating conditions from season to season is apt to be very great. This fact must be taken into account in attempting to standardize the processes and materials used in such mills, and it is felt that a great many attempts at standardization have failed because this fact has not been recognized or its importance realized. The conditions may be corrected at the source, the obvious thing being to heat the paper mill water in the fall, winter and spring, to within ten or fifteen degrees of the worst summer conditions. If then the processes and materials be so standardized that none of the usual summer troubles occur the change of the seasons would have little if any effect. This is an expensive procedure, but unless a cheaper way could be devised, the mill superintendent who has worked under such bad conditions as to give the effects discussed above, would testify that the expenditure was justified.

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## The Swarm of Bees

By DR. FRANK CRANE

THERE is a swarm of Bees. If you attend to them, they will make you the honey of success. And if you neglect them, you are apt to get stung:

Be polite. Politeness will get you out of more difficulties, climb you more hills, cut you more barbed wires, find you more smiles, than any other quality you can acquire.

Be sure. Don't guess. Don't suppose. Find out exactly. Know. And if you don't know, ask.

Be clean. Water and whiskbrooms are cheap.

Be honest. Even when nobody's looking.

Be on time. People that have to wait for you don't like you.

Be patient.

Be cheerful. And if you can't be cheerful, look cheerful, anyhow.

Be considerate. Don't be officious, nor meddlesome, nor a nuisance, but—you know—be considerate.

Be careful. Better be careful one hundred times than get killed once. Look out for these bees.

# The Utilization of Jack Pine in the Manufacture of Newsprint

By MAURICE NEILSON
The Belgian Industrial Co., Ltd.

*Paper Read at the Annual Meeting of the Technical Section of the Canadian Pulp and Paper Association, Montreal, January 25 and 26, 1922*

THE subject of this paper is, I think, familiar to if not popular with most mill men.

In saying that it is not a popular subject, I mean that to the operating man, the words Jack pine are often something in the nature of a bugbear which ought to be kept very much outside the mill gates.

When the production drops below the mark, and the manager wants to know the reason why, the operating man is apt to reply, "What can you do, with all this Jack pine coming into the mill!" Or he may even in desperation make a dash for the log pile to find out what deviltry the wood room superintendent now is up to.

However, to the manager the possible use of Jack pine in the mill presents a point of view which the operating man is apt to overlook, namely, that of economy.

The economical aspect of this question is admittedly of considerable importance to the Canadian News Print Industry.

Much has been said and printed concerning the future of this industry, which in its present form is altogether dependent upon the forest for its raw material.

On one point most authorities appear to agree, however, and that is that our available spruce forests are being slowly depleted.

This means, of course, longer log hauls, more expensive driving and a higher priced wood at the mill.

In the meantime we are allowing the pine to rot in our woods.

In the pine we have a tree which grows in sandy soil where the spruce will not grow, and which reaches a commercial size in from thirty to forty years, while it takes the spruce around seventy to eighty years to reach the same size, and it is evident that if the pine can be used in the manufacture of newsprint together with, or in the place of spruce, it would be of considerable economical benefit to the Canadian Newsprint Industry.

This question has been in the mind of the management of the company with which I am connected for some time, and during the early part of last year it was decided to find out whether this particular nigger in the wood pile really is as black as he is generally painted.

I think it will be of interest to establish here what Jack pine is. To the casual observer it seems to have as many names as a cat is reputed to have lives. You take a block of wood to the wood expert—there is at least one around the mill—and ask him what species that is and he perhaps tells you that it is gray pine. Another may say it is pitch pine, and a third, cypress. It is, of course, evident that the pine growing in this province consists of white pine or Pinus Strobus and Jack pine or Pinus Divaricata. Of these white pine grows principally in the Ottawa and Matawan valleys, while Jack pine predominates in the St. Maurice and Abitibi valleys. In addition there are found scattered stands of red or Norway pine (Pinus Resinosa).

The latter species is, however, found in such small quantities as to be of no consequence, being only about one-third of one per cent of the total yearly cut.

As the pine used during our experiments came principally from the St. Maurice valley, it is thus apparent that it really consisted of Jack pine.

During the experiments, which will be described below, the Jack pine was used in the sulphite process principally, on account of the practical difficulties in the way of collecting enough pine to run the whole groundwood mill over a sufficiently long period.

Table No. 8. Digester Data of Jack Pine Cooks.

| DATA | Monthly 165 | Cooks 16 | No. 109 |
|---|---|---|---|
| Date | Feb. 28 | Mar.7 | Mar.16 |
| Moisture of chips % | 36.0 | 39.0 | 43.9 |
| Steaming time Hours | 10.45 | 9 | 8 |
| Filling time Mns | 40 | 30 | 30 |
| Acid pumping time " | 15 | 15 | 15 |
| Total cooking time Hrs | 11.55 | 10 | 9 |
| Cooking acid:- | | | |
| Total $SO_2$ % | 6.00 | 6.20 | 6.16 |
| Combined $SO_2$ % | 1.36 | 1.20 | 1.26 |
| Free of total $SO_2$ % | 77.3 | 80.7 | 79.5 |
| Acid temperature °C. | 34 | 32 | 32 |
| Steam pressure on main line lb./sq." | 114 | 114 | 116 |
| Steam temperature deg.F. superheat | 150 | 150 | 140 |

| | % $SO_2$ Tot. | % $SO_2$ Comb. | % $SO_2$ Tot. | % $SO_2$ Comb. | % $SO_2$ Tot. | % $SO_2$ Comb. |
|---|---|---|---|---|---|---|
| Acid test, after 3 hours | ... | ... | 4.02 | ... | 4.22 | 0.82 |
| 4 " | 4.12 | 0.92 | ... | ... | 3.80 | 0.88 |
| 5 " | 3.18 | 0.86 | ... | ... | 2.06 | 0.81 |
| 6 " | 3.44 | 0.70 | 2.98 | ... | 1.90 | 0.84 |
| 7 " | 3.26 | 0.60 | 2.24 | ... | 1.10 | ... |
| 8 " | 2.86 | 0.46 | ... | ... | ... | ... |
| At blow | 0.60 | ... | 0.60 | ... | 0.14 | ... |
| Top relief opened after Hrs | 3.15 | | 2.00 | | 2.00 | |
| Draining commenced after " | 7.30 | | 5.00 | | 4.45 | |
| Draining finished after " | 8.15 | | 6.45 | | 5.30 | |

It was at first, of course, necessary to proceed very slowly, as we had no previous experience in cooking Jack pine, except for occasional runs of from 10 to 15 per cent mixed with spruce.

The digester was up to pressure in 3.15 hours and

the maximum temperature 144° C. was reached after 10 hours.

In the first column of table No. 1 the cooking data of this cook are given.

This first cook did not look particularly good. The color was very poor and there was a larger percentage of short, weak fibres. The following cook was greatly improved in both appearance and quality of fibre. The steaming time of this cook was 10.45 hours, but the maximum temperature was reached one hour earlier than during the first cook.

Having thus been established that Jack pine could actually be made into sulphite on a commercial scale, we were ready to continue the experiments, and to determine the following points: The most suitable cooking time, the yield of pulp per cook, and the action of the stock on the paper machines.

In all, 587 cords of wood was used, the paper mill was run on Jack pine sulphite during 12 whole days and 1,975 tons of paper made. During this time the sulphite mill was run entirely on Jack pine.

We soon found that we could materially cut down the steaming time from 11 hours, and through continual experiments we finally reached a steaming time of 9 hours.

Thirty-four cooks were then made with steaming time varying from 8.45 hours to 9.45 hours, depending on the strength of the acid. Column 2, table No. 1, gives the cooking data of a representative 9 hours cook.

Table No.2. Yield of Air Dry Sulphite from Jack Pine

| Date | No.1 & 2 Tons | No.3 Tons | No. of cooks | Per cook No.1 & 2 Tons | No.3 Tons. |
|---|---|---|---|---|---|
| March 3 | 60.29 | 2.52 | 7 | 8.63 | 0.36 |
| " 4 | 72.48 | 2.97 | 7 | 10.36 | 0.42 |
| " 5 | 67.45 | 4.36 | 7 | 9.66 | 0.63 |
| " 6 | 27.71 | 2.57 | 3 | 9.24 | 0.85 |
| " 16 | 59.71 | 7.23 | 6 | 9.94 | 1.22 |
| " 17 | 52.45 | 6.71 | 7 | 7.50 | 0.90 |
| " 18 | 64.99 | 8.36 | 7 | 9.30 | 1.19 |
| " 19 | 27.65 | 2.56 | 3 | 9.23 | 0.85 |
| " 20 | 25.66 | 3.43 | 3 | 8.59 | 1.14 |
| " 21 | 63.87 | 6.42 | 8 | 10.48 | 0.80 |
| | | Average: | | 9.38 | 0.82 |

| | No.1& 2 Tons | No.3 Tons | Total Tons | % Screening |
|---|---|---|---|---|
| Yield from 9 - 10 hrs cooks | 9.34 | 1.62 | 10.96 | 14.8 |
| Yield from 8 hrs cooks | 8.42 | 2.54 | 10.93 | 23.2 |

In examining these figures we find that the acid was of very good strength, having a combined $SO_2$ of 1.20 per cent with free $SO_2$ equal to 80.7 per cent. The digester was up to pressure in 2 hours, while the maximum temperature, 145° C., was reached after 8 hours.

The wood chips during the tests had an average moisture content of 38.7 per cent. The size of the chips was our standard, containing around 20 per cent ½", 60 per cent ¾", and 20 per cent 1".

We were not, however, satisfied that we had reached the shortest possible cooking time in the 9 hours cook, so we ran off one cook in 8 hours. The data is shown in column 3, table No. 1.

Part of this cook was digested, the quality of fibre being good. A very large part of the wood was, however, not at all or only partly cooked. The percentage of screenings was very high, as will be shown further down. The circulation in the digester was very good during this cook, the temperature following the standard curve set. There was no evidence of too quick turning of the liquor, and at the blow the liquor was of normal color and smell.

It is therefore evident that the low yield of properly digested fibre was due to the relatively slow penetration of the pine chips. The uncooked part consisted mainly of large chips only partly attacked by the acid. This fact suggests the possibility of obtaining a better yield with a relatively short cooking time by using chips considerably smaller than what at present is the standard for spruce chips.

Table No. 2 shows the yield of sulphite obtained from Jack pine.

It should be noted that during the period of March 3rd to March 6th, owing to trouble with our refining system, we could not recover all of the screenings.

The average yield of No. 3 sulphite per cook from March 16th—1.62 tons—therefore gives the more nearly correct figures for the amount of screenings obtained.

A total yield per cook of 10.96 tons was thus obtained from Jack pine, with a cooking time of 9 to 10 hours, and with a cooking acid of about 6 per cent total $SO_2$.

The 8-hour cook gave a total of 43,711 pounds of Nos. 1 and 2 sulphite, 38.50 per cent air dry test, or a dry weight of 8.42 tons.

The screenings amounted to 2.54 tons of 23.2 per cent.

From the results obtained during these experiments, it is apparent that a fair yield of pulp is obtained with Jack pine. The screenings are somewhat higher than with spruce, when steamed the same length of time and under the same conditions, say about 8 per cent for spruce against 14 per cent for Jack pine.

Let us now see how the Jack pine sulphite behaves on the paper machines.

An investigation of the fibre does not show in any way that it is unsuitable for newsprint. The fibre is long and rather coarse but of very good strength. As for pitch, some rather interesting figures are shown in table No. 3. From a chemical point of view, pitch is not easily defined.

It is an oxidation production of resins and balsams in the wood. It is soluble in alcohol and ether, and

thus the amount of alcohol-ether extract is a measure of the amount of "pitch" in the wood or the pulp.

The figures in this table indicate that Jack pine does not contain a great deal more "pitch" than does spruce.

On comparing the figures giving the amounts of alcohol-ether extracts obtained from spruce sulphite made during 1920 with those of Jack pine sulphite, it is also found that there is really not such a large amount of "pitch" in the latter as to make any appreciable difference on the paper machines. This is

Table No.3 - Pitch Contents in Wood and Sulphite Pulp

| Description | Ether Extract % | Alcohol Extract % |
|---|---|---|
| Fresh Spruce | 0.79-1.80 | 0.70-1.94 |
| Jack Pine Chips | 2.10 | 1.43 |
| Jack Pine Sulphite Lap Cook #20 | 2.23 | 0.42 |
| " " " " " #24 | 2.02 | 0.43 |
| Average of 83 samples of Belgo Sulphite, June 1st - Oct 15th, 1920 | 1.56 | - |
| Belgo Sulphite, claimed to cause pitch troubles on paper machines. | 1.27 | 0.38 |

actually born out by our experience during the time we were running on Jack pine.

The first day we really did have a great deal of trouble on the machines. This was, however, due to causes, which will be discussed further down. With this exception, during the 12 days we were using Jack pine sulphite on all the machines, the mill was running exceptionally well. It is, of course, evident that whatever troubles might be expected would show up during this length of time.

The time recorder charts showed clearly that the machines were running exceptionally well.

In table No. 4 is further given the number of breaks, lost time and speed of the machines in 24 hours during the experiments, compared with those of several other periods. An examination of this

Table No.4 Comparison of breaks, time lost and speed of Paper Machines per 24 hrs. during run with Jack Pine Sulphite.

| | | Period of run with Jack Pine Sulphite (Feb - March) | Period Feb.1 to 15, 1921 | Aver Jan 1921 | Aver Jan 1920 | Aver Feb 1920 | Aver March 1920 |
|---|---|---|---|---|---|---|---|
| **No.1 Machine** | | | | | | | |
| No of breaks | | 9 | 17 | 19 | 18 | 23 | 17 |
| Time lost | Mns. | 48 | 82 | 104 | 85 | 114 | 84 |
| Speed | F.P.M. | 636 | 626 | 628 | 623 | 621 | 625 |
| **No. 2 Machine** | | | | | | | |
| No of breaks | | 6 | 13 | 13 | 27 | 17 | 18 |
| Time lost | Mns. | 30 | 68 | 74 | 140 | 86 | 78 |
| Speed | F.P.M. | 625 | 629 | 628 | 603 | 603 | 599 |
| **No.3 Machine** | | | | | | | |
| No of breaks | | 16 | 18 | 19 | 15 | 16 | 18 |
| Time lost | Mns | 88 | 76 | 89 | 76 | 63 | 88 |
| Speed | F.P.M. | 635 | 646 | 644 | 625 | 625 | 625 |
| **No. 4 Machine** | | | | | | | |
| No of breaks | | 13 | 15 | 19 | 24 | 22 | 20 |
| Time lost | Mns | 71 | 88 | 89 | 121 | 110 | 100 |
| Speed | F.P.M. | 650 | 662 | 663 | 622 | 648 | 651 |
| **All Machines** | | | | | | | |
| No of breaks | | 44 | 64 | 69 | 84 | 78 | 73 |
| Time lost | Mns | 232 | 314 | 366 | 422 | 373 | 350 |
| Speed | F.P.M. | 637 | 636 | 640 | 656 | 624 | 625 |

table shows that the number of breaks and time lost was actually less than during the other periods compared, while speeds compared very favorably. The wire seams were cleaned on an average once a day, while the washing up was done very much as usual.

Table No. 5 shows finally that the paper production did not suffer during this time and that the bursting strength and moisture were well maintained. In regard to the Mullen test, it should be noted that during the run the basis was 0.56 per cent below 32 pounds.

From what has been related above, I think we can draw the conclusion that it is quite feasible to use Jack pine in the manufacture of newsprint. At least that is our experience. We are also convinced that Jack pine is not synonymous to pitch trouble. Of course, this applies to seasoned wood.

Green wood is apt to cause a great deal of trouble on the paper machines, probably due to the fact that in green wood the resinous matter is in a more or less fluid form, while in seasoned wood it has been oxidized to a hard brittle substance. This applies, however, also to spruce, and in the speaker's opinion green spruce is as apt to cause pitch trouble on the paper machines as pine is.

Table No.5 Comparison of Production, Basis, Test, Moisture and Sulphite used for paper machines per 24 hrs during run with Jack Pine Sulphite.

| | Period of Run | | January 1921. | Year 1920. |
|---|---|---|---|---|
| No. 1 Machine | Tons | 43.79 | 41.87 | 42.18 |
| 2 " | " | 41.75 | 42.46 | 41.39 |
| 3 " | " | 52.46 | 53.44 | 51.78 |
| 4 " | " | 70.49 | 72.63 | 70.80 |
| All Machines | " | 208.49 | 210.10 | 206.12 |
| Basis | lbs | 31.82 | 32.08 | 32.17 |
| Test | lbs/sq.inch | 9.42 | 9.17 | 9.51 |
| Moisture | % | 8.79 | 9.08 | 8.94 |
| Sulphite in Paper | % | 28.04 | 27.47 | 26.47 |

I said above that we do not consider Jack pine synonymous to pitch trouble. On the contrary, we have found that Jack pine often is blamed where it is not really the guilty party. To illustrate this, I can show a time recorder chart from February 24th, the first day of our experiments. An examination of the chart would show that during the forenoon of this day the paper mill was having any amount of trouble from, what was at first thought, pitch in the Jack pine sulphite. We soon found, however, that this was not really the case, because, through a misunderstanding in the wood-room, the Jack pine had been sent to the groundwood mill instead of to the sulphite mill.

The groundwood mill not being prepared for this sudden invasion of Jack pine, did not have the stones properly dressed, with the consequences that for some hours a totally unsuitable grade of pulp was supplied to the paper machines.

An examination of the stock showed that it contained an excessive amount of short and floury fibres

together with a large amount of short, coarse fibres, the worst possible combination for our machines. It acted very "sticky" on the wires and couches, did not form properly and caused innumerable breaks.

This fact gave us the clue to what we believe in a great many instances is the real cause of so called "pitch" troubles, to-wit: short and floury stock. We have from time to time had similar troubles on the machines and we have found the same answer—short and floury stock. For some time we have been testing the freeness of the groundwood stock all through the twenty-four hours, and we have found that a drop in the freeness below a certain point will invariably cause these troubles on the machines. The wire becomes dirty, and has to be steamed and the paper sticks to the clothing. These troubles disappear as by magic the moment the stock is freed up.

Although we have not so far been able to run the groundwood mill altogether on Jack pine, we have been using considerable amounts of pine mixed with spruce, and we have found the above to be true also in this case.

On some occasions we have been using, according to our observations, as much as 35 per cent of Jack pine in the groundwood mill, and we have had no troubles with pitch as long as the stock has been kept up. Of course, the stones have to be dressed properly to take care of the pine.

# Power Plant Management

## Choosing the Condenser

By ROBERT JUNE, M. E.

THE primary reason for the installation of condensers in power plants is the reduction of back pressure on the prime mover. If saturated steam is confined in a closed vessel and cooled, condensation of the vapor, with a drop in temperature, will result. The greater the drop in temperature the greater will be the amount of steam condensed and the greater the decrease in pressure. In actual practice, all of the steam can never be condensed, since this would call for a temperature of absolute zero—492 degrees below the freezing point; hence, the pressure can never be reduced to zero.

When water is used for cooling, the minimum temperature which can be secured is 32 degrees F., which corresponds to the pressure of 0.0886 lbs. per sq. in., or 0.1804 inches of mercury. This, then, is the lowest condenser pressure which can be obtained.

In a condenser, the processes of condensation and removal of the air and condensed steam are continuous. The tightness of valves and joints, the amount of entrained air, and the temperature to which the condensed steam is reduced, are the factors which determine the degree of vacuum obtained.

There are a number of ways in common use of expressing the degree of vacuum. (a) Thus to refer to a 28-inch vacuum is to indicate that the pressure of the atmosphere is 28 inches of mercury higher than the pressure in the condenser. (b) Vacuum may be expressed by percentage; thus to refer to a 90 percent vacuum would indicate that with the barometer standing at 30 inches, a vacuum of 27 inches had been secured. With a lower barometer, say 28 inches, it would indicate a vacuum of 25.2 inches. It will thus be seen that expressing vacuum in percentage gives an idea of the efficiency of the condensing steam.

In indicating vacuum, the point of measurement should always be stated, since the greatest vacuum will be found at the air pump intake, the next highest in the body of the condenser, and the lowest at the steam inlet.

### Gain in Power Due to Condensing

As a general proposition, an engine running condensing will require from 20 to 30 percent less steam for a given work than will the same engine running non-condensing. Unfortunately, this decrease in steam consumption is not all pure gain. Steam may be used in creating the vacuum or power necessary to operate the condenser auxiliaries, varying from 1 to 6 percent of the main engine power, depending upon the equipment and conditions of operation. The cost of installation and of the maintenance of the condenser must also be charged up against the saving effected. Even if these deductions are made, condensing is found to be a very profitable operation in power plants where the exhaust steam is not used for heating or manufacturing purposes.

### Conditions of Condensation

There are many types of condensers in use, but in general, condensing machinery can be divided into two main groups: surface condensers, where the steam or vapor to be condensed is separated from the condensing water by metal tubes or diaphragms, and jet condensers, where the steam or vapor and the condensing water are brought in actual contact with one another. The jet condenser can further be divided into the regular low jet type, situated generally below the surface of exhaust steam or vapor, in which type both the condensed steam and the condensing water are discharged to the atmosphere by means of a pump working against a head corresponding to the vacuum in the condensing chamber,

which for a vacuum of 28 inches corresponds to a head of approximately 31-7 feet, not including friction; and the barometric jet condenser in which the condensing chamber is placed high enough above the hot well to discharge the condensate and condensing water by overbalancing a barometric column.

A vacuum which will raise mercury against the action of gravity one inch will raise a column of water 1.132 feet. Therefore, if there were a perfect vacuum in the chamber of the condenser, it would raise a column of mercury 30 inches and a column of water 34 feet at sea level, against the action of gravity. A vacuum of 28 inches in the chamber would, therefore, support a column of water in the tail pipe 31.6 feet high. If the condensing chamber be placed slightly higher than this from the level of the water in the hot well, any amount of water added

*Fig. 1—The Bulkey Injector Condenser*

to the column will discharge a corresponding amount into the hot well from the bottom of the tail pipe. By this well-known principle of the barometric column the injection water is discharged from the system, in a barometric condenser, without the use of a pump. The engine or turbine is protected from water being pulled into the exhaust pipe by placing the upper flange of the condenser higher than 34 feet above the level of the water in the hot well. It is, therefore, unnecessary to rely on any vacuum brakers or check valves to protect the units from damage from this source.

If pure water vapor were delivered to the condenser, it would be a simple matter to create and maintain a perfect vacuum in the air condensing chamber, but, unfortunately, steam always carries with it, air and other non-condensable vapors, which expand in the condensing chamber after the steam has been condensed and which would eventually destroy the vacuum if not removed.

The amount of air in a condensing system varies greatly; but, roughly, the amount of air measured at atmospheric pressure present in condensing systems or turbines ranging from 500 kw. to 200 kw. may vary from 1 to 15 cubic feet per minute, depending on the condition of the unit.

Air enters a condensing system through three sources: about 4 percent of the total amount of air enters through the feed water to the boilers; about 47 percent leaks in through stuffing boxes, joints and porous spots in castings (this amount can be greatly reduced by a little care); and about 40 percent of the total amount enters with the condensing water (this figure can also be reduced by having a tight suction line or other means described later).

If proper care be displayed in the design, construction, erection and maintenance of the condenser and piping, the air leakage can be greatly reduced and labor so expended more than pays for itself later. A slight leak in a vacuum line or stuffing box will cause much more waste of coal than a considerable leak in a steam line. Nobody would think of installing an extra boiler to take care of these leaks, in the latter case mentioned, although many dry vacuum pumps have been installed to remove air in the former case, entering the system through leaks. The prevention of practically all leaks in exhaust lines is simply a case of proper design, erection and materials.

To eliminate this air, which is present more or less in all condensing systems, is by far the most difficult problem connected with condenser design, and all jet condensers differ from one another only in the means they employ to accomplish this result.

## Jet Condensers

We have referred to air elimination as the most difficult problem in condenser design. Let us see how it is met in a few standard makes of condensers.

The Bulkley Injector Condenser, as the name indicates, removes the non-condensable vapors by the injector action of the condensing water flowing through a contracted throat of special dimensions and designs. The condenser which is illustrated in Fig. 1, consists of an iron casting machined to the required dimensions and fitted with a heavy brass cone.

Water enters the system at B and circulates in the belt about the brass cone C, falling through the annular space G, between the outer circumference of brass cone C, and the inner surface of the casting and forming a moving cone of water D, with a sharp vortex. Steam enters at A, passing through the interior of the cone C, and meets the water at G, imparting to it what velocity it has on being condensed. This tends to force more water through the annular space. The condensed steam water and non-condensable vapors are brought down through the hollow cone of falling water D, and the non-condensable vapors discharged through the contracted throat F.

The lower portion of the condenser expands until

it is the same size as the tail pipe E. This allows the air and non-condensable vapors which have been brought through the contracted throat F, to expand, thus making it impossible for them to get back into the condensing chamber. They are, therefore, taken down through the tail pipe and delivered to the hot well.

The Westinghouse LeBlanc jet condenser is illustrated in Fig. II. Steam entering the top of the condenser meets an incoming charge of water and is quickly condensed, it falls to the base of the condenser and is removed by the centrifugal discharge pump, the non-condensable vapors being ejected through the medium of the LeBlance air pump. The condenser body, of ample proportions, is made of close grained cast iron, the upper portion of which forms an annular channel for distributing the circulating water through several nozzles into the condenser. A much faster, and at the same time more intimate mixture of steam and water takes place with the sub-division of this incoming water if the total quantity of water were passed into the condenser through a single opening. A very powerful breaker is attached to condenser body and serves to break the vacuum in case of accident to pumps, thus preventing water from rising above the top of the condenser.

The circulating and air pump castings are placed directly beneath the condenser body and, in addition to housing the pump runners, serve the purpose of supporting the condenser. In order that either pump may be removed with convenience and dispatch without disturbing the other, the casings are cast separately, hand holes also being provided on each pump to facilitate inspection.

In the Roturbo rotary jet condenser the mixture of steam and water is secured by means of a revolving impeller. After the water jets have traveled rapidly some distance, so that the broad parts of the water fans have all combined to form a complete ring of spray and condensed the steam, the problem, as in the case of all other condensers, is to extract the condensate and air with certainty and efficiency, and it is at this point that this condenser differs in principle from all other types.

Instead of giving the water jets as they leave the injection nozzles in the drum sufficient energy to extract themselves from the vacuum chamber and carry with them without further assistance the air and condensate, or instead of letting the condensate accumulate in the bottom of a large condenser chamber, where the air is separated and from which the air and water are independently extracted by auxiliary apparatus, the rotating jets of spray or condensate, with the entrained air are picked up by the blades of an exhaust fan, concentric with the rotating pressure drum, and of a larger diameter, and ejected with certainty and efficiency.

Surface condensers consist essentially of a cast iron shell provided with a tube set in each end into which brass tubes are expanded. The exhaust steam fills the shell and flows around and between the tubes, while the cooling water is forced through the tubes by means of a circulating pump. Contact with the cool tubes condensed the steam and the condensate drops to the bottom of the condenser from which it is exhausted. The Wheeler condenser, which is fairly representative of the best type of surface condenser, is illustrated in Fig. III. In the Alberger condenser, which is not illustrated, the steam enters through a deep rectangular steam distributing dome, extending nearly the full length of the condenser shell. The sides of this distributing dome slope

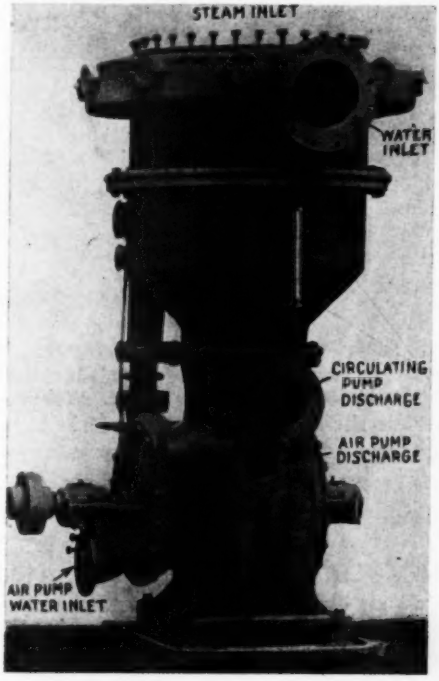



*Fig. 2—Westinghouse Le Blanc Condenser*

downward and become tangent to the main shell, leaving an arc of nearly 180 degrees of the tube surface exposed to the entering steam. The construction of this steam dome evenly and effectively distributes the entering steam over the full length and breadth of the tube surface and brings it at once into contact with the greatest possible number of tubes.

With regard to surface condensers, the following points should be given care in choosing such equipment:

1. Upon entering the condenser, the steam should encounter the minimum of resistance practicable, and the pressure drop through the condenser should be just as small as possible.

2. Rapid air removal and freeing from entrained water should be provided.

3. Condensate should be returned to the boiler and

freed of air as rapidly as possible and at as high a temperature as possible.

4. There should be as little obstruction as possible to the circulating water in all parts of the condenser.

## Choosing the Condenser

As with other types of equipment, the choice of a condenser for any given plant depends upon the individual conditions. Engineers differ somewhat in their estimate as to the volume which a condenser should have with reference to that of the engine cylinder with which it is connected, but a generally

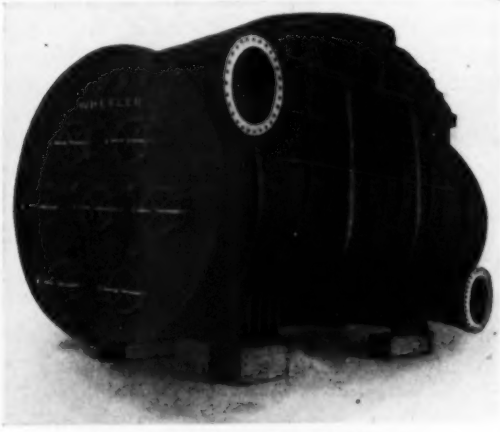


*Fig. 3—Wheeler Surface Condenser*

accepted figure is that the condenser volume should be three-fourths of the engine cylinder.

The general advantages and disadvantages of the different types may be briefly summarized as follows:

## Jet Condensers

ADVANTAGES:

1. Least expensive to install.
2. Occupy very small space.
3. Installation does not require hot well pump.
4. Cost of maintenance low.
5. Requires less water than surface condenser.
6. Acidulated or otherwise impure water may be used.

DISADVANTAGES:

1. Condensate is wasted.
2. Failure of apparatus might flood turbines.

## Surface Condensers

ADVANTAGES:

1. Condensate can be used for boiler feed.
2. Better vacuum obtainable.
3. Low pumping head.
4. Less chance of losing vacuum because a drop in vacuum does not affect water supply.

DISADVANTAGES:

1. High initial cost.
2. Comparatively high cost of maintenance.
3. Large floor area required.
4. Acidulated or impure water cannot be used.

## Barometric Condensers

ADVANTAGES:

1. First cost reasonable.
2. Low cost of maintenance.
3. No danger of flooding turbine.
4. Acidulated or impure water can be used.
5. Require less circulating water than condenser.

DISADVANTAGES:

1. Possibilities of air leaks in long exhaust pipes.
2. Loss of vacuum between condenser and turbine amounting to ½ inch or more.
3. Construction not adapted to building plan of many engine rooms.
4. Condensate is wasted.

Where there is a supply of water suitable for cooling purposes and for boiler feed, the jet condenser is most suitable. When the cooling water is not suitable for boiler feed and the separate supply of boiler feed is expensive, the jet condenser is not so desirable, inasmuch as the condensed steam is mixed with the cooling water which is unfit for boiler feed. Under such conditions, the condensate is lost, so that a continual fresh supply of boiler feed must be procured. A surface condenser would be better for this condition since the condensed steam and cooling water are kept separate and, therefore, the condensate may be saved and returned to the heater, thus insuring a minimum amount of boiler feed make-up.

## Notes on Condensers

With the low level jet condenser where water enters the condenser by virtue of its own vacuum, the maximum lift should not exceed 18 feet and the minimum not less than 6 feet.

If the cold well cannot be located near the condenser, the greatest care must be exercised to see that all water lines are perfectly air tight.

The amount of water required for the air pump is approximately 15 percent of that used for condensing purposes, that amount, as a general rule, being discharged to the hot well.

A head of any more than 10 feet is the maximum against which the air pump is able to discharge, hence, with cooling towers or spray pond installations, the air pump discharge must never be led into the main condenser discharge.

Pipe lines should be as short and as free as possible of air, thereby reducing friction losses to the smallest possible amount. Also use long radius elbows and avoid tees, using flange pipes on all lines subject to vacuum.

The quantity of water used by the air pump should be regulated by a gate valve. A check valve should be provided in the air pump discharge line to provide return flow.

With turbine driven condensers, a good valve should be provided in the steam line next to the governer valve on the turbine and a drain provided for this valve. An expansion joint should be installed

on the exhaust line over the turbine in order to prevent pipe strains which may cause the turbine to get out of alignment with the pumps. With motor driven condensers, the motors must be protected from water. Do not use high voltage; it is dangerous to the operation of hydraulic machines as well as to the operators. Use motors with impregnated windings as a valuable protection against moisture.

The best arrangement for a barometric condenser is one where the level of the cold well is not greater than 18 feet below the center line of the injection opening on the condenser. With this arrangement, the circulating pump is unnecessary.

Avoid long horizontal lines. Make exhaust lines as large in diameter as possible, thus reducing pressure drop to a minimum. Provide exhaust pipes with atmospheric relief valve.

The injection line should be provided with a gate valve for regulating the amount of water used by the condenser. Another gate should be provided in the air line between the air pump and the condenser.

Study the arrangement of steam paths into the tube bank. The lower tubes are surrounded with films of water and dense air which seriously impede the flow of heat.

See that your condenser tubes are kept clean. With dirty tubes the rate of heat transmission is greatly reduced and the vacuum is insufficient for the efficient operation of the prime mover.

Do not buy a smaller condenser than you need. A uniform high vacuum over operating periods is worth far more than the initial investment saved by reducing the tube surface.

# Shipping

By H. M. GRASSELT

THE Shipping Department plays an important part in each industrial organization. It constitutes one of the main factors in retaining the good will of customers, in building up new trade and in the promotion of better business relations generally. Shipping means "Service," and every one of us must realize that "Service" has now assumed a more profound meaning during the last year or two.

During the war, the abnormal business, the excessive demands for our goods, congestion on railroads and insufficient ocean transportation facilities made manufacturers less attentive, or appear to be indifferent to their customers' wishes. We all have vivid recollections of that period's unkept promises. Many a time has the customer been assured, for instance, that his order would be shipped "in two weeks," yet those "two weeks" frequently extended into two months or even more. Excuses, justified or unjustified, were found for every case, and under the then prevailing conditions, the customer was, or seemed to be, satisfied to receive his goods at all.

Conditions have changed fundamentally during the past ten months, and business has fallen from intoxicated prosperity to a "hang-over" depression, such as has not been witnessed for many decades. This industrial depression, however, will not last forever, and just now we note a slow, but steady revival of business. With the resumption of greater activity along all lines, let industry resolve to stress the importance of the word "Service," which means prompt execution of orders, speedy dispatch of the goods, superior quality in superior packing.

On our department of packing and shipping is dependent in a large measure the keeping of our promises: the former in the quick execution, the latter in the prompt dispatch of orders. Shipments may be divided into "Domestic" and "Export."

Many mills have introduced standard wrappers and standard cases for domestic shipments. Then again, many papers have to be wrapped and packed according to our customers' wishes. As a matter of fact, many dealers have their special wrappers and labels.

Mills should make it a practice to ship stock orders on the day they are received, or on the following day at the latest. Express orders must leave the mills on the day they are received. Make orders should be assembled in the most expeditious manner and promptly forwarded. Papers which are to be wrapped, must be put up securely and neatly, labels applied in a painstaking manner, so that the goods, when taken from the cases and put on shelves, are pleasingly presentable. We must, furthermore, avoid the use of faded wrappers. Whenever stock has been stored for some time and the wrappers have, for one reason or other, lost their original color or turned streaky in places, re-wrap the reams.

Cases must be made to insure safe delivery to their places of destination. It is essential that they are made in the right size and not so large that the contents slide hither and thither and thus damage the packages and edges of the paper. Line the cases properly also. If you don't some rough spot on the surface of the board may destroy or damage the wrappers. Furthermore, without lining, the goods will be easily affected by elemental influences from without, such as moisture or heat. Nail the cases carefully and be sure that the nails are not hammered sideways, thus damaging the paper.

Eastern mills, as a rule, do not strap cases for shipments east of the Mississippi, but those going beyond

should be protected and re-enforced by at least two iron bands.

Many mills have adopted standard cases with a gross weight of approximately 575 lbs. Such a case will contain, for instance, twenty reams of No. 4 Bond, 22x34-26, or the double quantity in folio. Standard cases are used with great advantage by mills which carry extensive stock lines, and have consequently numerous shipments of uniform sizes and weights. The adoption of standard cases permits the making of cases in advance and the storage of shooks sawed to the required dimension, which, whenever necessary, require but the putting together.

Customers, too, favor standard cases, for they know that at any time they receive a certain grade of paper, the case will contain an established number of reams, and not twenty today and twenty-two or eighteen in the next shipment.

Marking must be plain and distinct. Utmost care is to be taken in stenciling the address in order to prevent misdirections of consignments. If the customer desires special marks, numbers or letters for identification or other purposes, be on the alert to comply with his request implicitly. An omission may mean a dissatisfied customer, and a dissatisfied customer very often means a customer lost.

Contents, of course, must be checked carefully against the packing lists. It is very annoying, to say the least, to have the customer complain of shortages and ask for adjustments. Therefore, every precaution should be taken to preclude the possibility of an error.

All these details, small and insignificant though they may seem, may prove, when properly attended to, essential factors in our business relations.

## Export Packing

Export packing is a subject about which the average packer has known but little heretofore, although packing and shipping are besides the merits of the goods, of course, an important factor in retaining the good will of the foreign buyer.

Proper export packing requires a thorough study on the part of the manufacturing exporter and the question of safe arrival of goods at their ports of destination at a minimum cost must be given due consideration. There exist standard packings for various commodities, but in many cases the exporter must be guided by his own knowledge. The foreign buyers' instructions must be carried out literally, for the slightest deviation may incur much expense, cause great trouble and lead to financial losses.

A careful check of the goods must be made before they are packed, for complaints from foreign customers are very difficult to adjust and often very expensive.

Particular pains must be taken to have the correct net and gross weights; the former is necessary in foreign trade in determining the import duties, the gross weight is required for transportation charges.

Cases should be free from holes; if there are any, they should be covered by a small piece of sheet metal tacked on from the inside. The case must fit; there must be no waste room inside. Ocean freight rates are mostly charged on the basis of cubic measurement and a waste of space would, therefore, mean needless increase in the charges. In certain countries, import duties are charged on the gross weight. The case should for that reason be made as light as may be consistent with strength.

Naturally, boards must be tightly joined, the goods protected by waterproof case lining. The cases must be properly re-enforced by strapping and extra cleats, for the journey is a long one and tons of other merchandise will probably lie on them while in the hold of the ship.

Dimensions and weights of each case must be shown on the case. Shipments going to other than English speaking countries should bear these marks in centimeters and the weights in kilos in addition to those in pounds and inches. These and other marks, like the addresses, must be stenciled in large, clear block letters of at least two inches high. To apply warning mark, such as "Handle with care," or "Use no hooks" is superfluous, for they are either ignored by longshoremen anywhere, or not understood in countries where another language is spoken.

European shippers take minute pains to please their oversea buyers, and their packing is, in some cases, elaborate. High grade writing papers and stationery are packed in heavy, waterproof wrapping paper (besides the regular ream or package wrapping, of course) and then put into tin-lined, well-made, joined wooden cases, re-enforced by iron strapping. The tin is soldered around the top, and very often oiled paper is used between the tin and the inner packages, so that, even if the tin is punctured, the oiled paper will resist the sea air or water. Less elaborate precautions are taken with cheaper grades of paper, but, nevertheless, in every instance the packing protects the contents against the elements and warrants safe delivery.

In our trade with certain Latin American countries, goods that have to be transported into the interior, are often carried over the mountains on the backs of mules or llamas. Here it is required that the cases not exceed 250 lbs. They must be slung on both sides of the pack animal for balance, and it is said that mules, for instance, refuse to move if loaded with even five pounds over the usual five hundred. In shipments to other foreign countries where modern transportation facilities are more advanced and extended throughout the whole country, cases of five hundred pounds gross weight may be taken as a standard. Invariable exactness is imperative; indeed, mistakes or misstatements may easily result in the imposition of a heavy fine on the importer. It has happened that goods even were confiscated, be-

cause the authorities suspected that defrauding of the government had been attempted.

The application of some custom laws is often very peculiar. One Latin American country, for instance, charges about one cent per pound on writing paper and three cents on printing paper. To establish the identity, the custom officer at the entrance port opens a case, takes a sheet or two, and scrawls a few lines with his pen. If the result is satisfactory to him, he charges the writing paper duty of one cent per pound, if not, he classifies the stock as printing paper and levies the high duty. Therefore, practically all paper for that particular market is ordered "Hard sized for Writing," and declared accordingly in the shipping documents.

Export shipments must be delivered to the vessel within the specified time. If a customer wants us to ship his order in July, he means that month and not August or September, for he may have contracted space in a certain steamer that sails in July. If we cannot comply with the customer's request, for one reason or other, and fail to notify him in due time of the fact, our customer may suffer loss. Then again, if a steamer is missed, there may not be another for several weeks, and this delay may cause the customer inconvenience and even financial loss.

Although most of the paper mills ship through export houses and not direct to foreign ports, they should make it a practice to at least have one man in their traffic department who is familiar with the principal requirements of export shipping.

During the war the paper industry had its large share in foreign trade and immense quantities of all grades of paper were shipped to Australia, Central America, South America and the Orient. Although Great Britain has regained much of her pre-war business with her dominions and the Orient, our exports to those countries are still large and we will predominate in many markets of Latin America. Even with the return of European competition, it is the opinion of many prominent business men that the United States will continue her predominance in Latin American markets. At least, our country will lead in the export of numerous lines of goods, among them paper.

Foreign customers expect their goods to be manufactured to sample. We must, therefore, continue to produce and deliver the best, not only to establish our business relations so that they may be permanently prosperous and profitable, that our customers will remain customers, but also to uphold the good reputation our goods enjoy abroad.

# Theoretical Cost of Grinding Wood

## Based on the Figures Derived from Experiments Made by J. H. Thickens at Madison, Wisconsin

By ROGER M. KINZLY

ONE thing we have always tried to impress upon ground wood manufacturers is the importance of cylinder pressure. J. H. Thickens in his report "The Grinding of Spruce for Mechanical Pulp" illustrates this fact graphically. (Fig. 1.)

"This cut shows the relation between the number of pockets used and the horsepower consumption per ton of pulp. In this test the power to the grinder and the speed were maintained constant; the power was utilized by varying the grinder pressure according to the number of pockets used. When using one pocket and a pressure of 120 pounds per square inch the consumption per ton was 58 horsepower, while with three pockets and a pressure of 26½ pounds the power consumption per ton was approximately 89 horsepower. This is only another way of demonstrating that the power consumption per ton of pulp in 24 hours is much lower under conditions of high pressure of grinding than under conditions of low pressure."

It must be remembered in grinding wood that the big items of cost are wood, labor and power. Anything that can be done to reduce the amount of money spent for each per ton of pulp, then, increases the net profit per ton, because the selling price remains constant, varying only with the market.

Let us direct our attention, therefore, to the first mentioned, wood. The accompanying illustration Fig. 2 shows the yield per hundred cubic feet of solid rossed wood in pounds at different pressure. Notice that the yield is greater as the pressure increases. It stands to reason, therefore, that less wood has to be consumed to produce a given quantity of pulp at high pressure than low. Because of this less money is expended for wood.

If you will stop to consider the cut shown in the last two issues of this organ and used again in this connection Fig. 3, you will readily see pressure plays a very important part in lowering the labor charge per ton of pulp. For example look at the third section of the cut; approximately two tons are ground at twenty pounds pressure when the stone is sharpest and at its best producing condition, however, when the pressure is increased to sixty pounds, six tons

are produced; an increase of two hundred per cent. This cuts the labor cost to one-third, because no increase in the labor charge has to be made to accomplish this result.

## The Power Bill

Now if we look at the first section of this same cut we are able to see at a glance where the power bill enters the argument. The power consumed at sixty pounds pressure when the stone is in its best

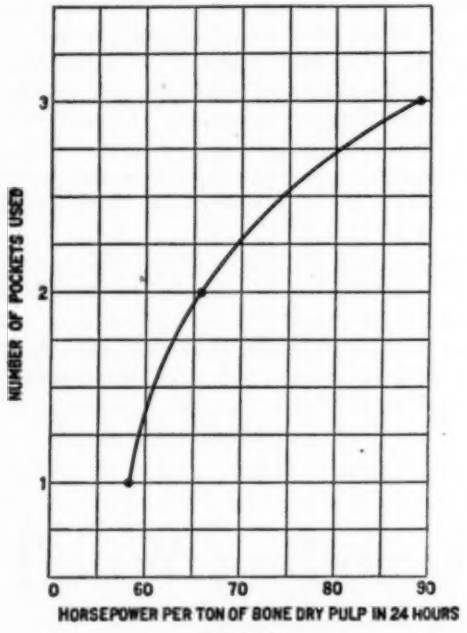



*Figure 1*

producing condition is only about forty per cent of that consumed when only twenty pounds pressure is used.

ject that we all can understand and appreciate. Taking, therefore, the three principal items—power, labor and wood, making up the cost of pulp, let us discuss one at a time.

Assuming power to be paid at twenty dollars per horsepower per year, we discover by examining the

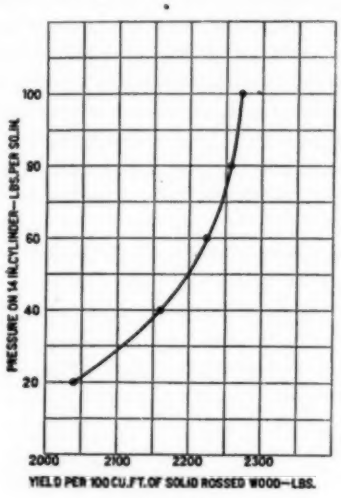



*Figure 2*

graph Fig. 3 that approximately one hundred and eighty hosepower is used when the pressure used is twenty pounds on a fourteen inch cylinder; two hundred and ninety at forty pounds pressure and four hundred at sixty pounds. This means that the power bill is 3,600 at 20 pounds; $5,800 at 40 pounds and $8,000 at 60 pounds.

## Labor

Assuming again that twenty cents an hour per grinder is the average labor charge, we discover that

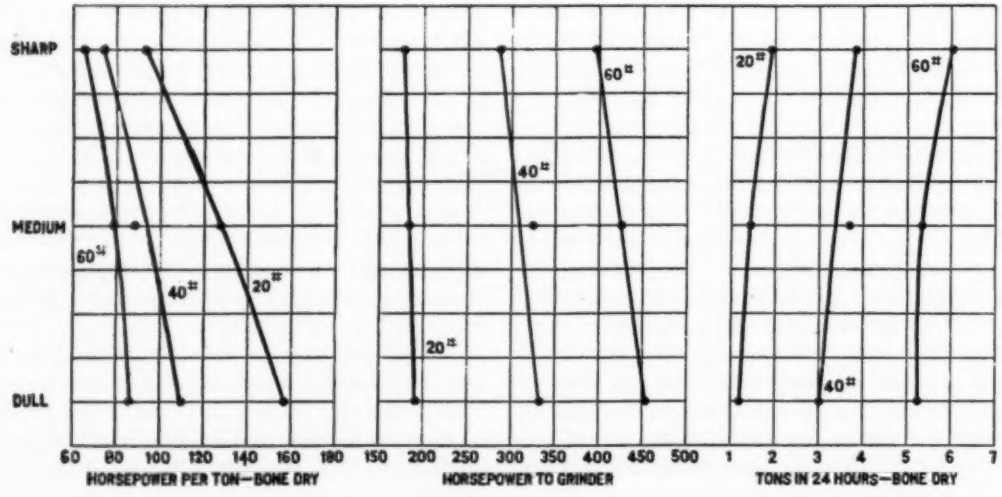



*Figure 3*

Let us put the matter in more tangible form. When we get to talking in dollars and cents we get to a sub- the labor cost per grinder is constant at $1,440 per year.

### $30.00 Wood

A more or less arbitrary price for rossed wood must be taken and we hit upon the idea of setting this at thirty dollars per cord and making the selling price of pulp thirty dollars a ton. We discover from the graph Fig. 3, that almost two tons are produced in twenty-four hours when twenty pounds pressure is used; 3.9 tons when forty pounds is used and six tons when sixty pounds is used. We must now look more carefully at Fig. 2, whereupon we find that the yield per hundred cubic feet of solid rossed wood at twenty pounds pressure is something like 2,040 pounds. Glancing for a minute at Fig. 3, we discover the production for three hundred working days at the different pressures used to be 600 tons at 20 pounds, 1,170 tons at 40 pounds, and 1,800 tons at 60 pounds pressure. We find therefore, a consumption of 58,800 cubic feet or 460 cords at 20 pounds; 108,300 cubic feet or 846 cords at 40 pounds; and 161,900 cubic feet or 1,265 cords at 60 pounds pressure. At thirty dollars a cord these would amount to $13,800.00; $25,-380.00, and $37,950.00, respectively.

### Sales

Sales would equal $18,000.00 at 20 pounds; $35,-100.00 at 40 pounds, and $54,000.00 at 60 pounds pressure, basing our figures on the production given by the graph Fig. 3, for three hundred working days per year.

### Recapitulation

To sum it all up then the table, below, has been prepared, showing a deficit of $840.00 at 20 pounds; a gross profit of $2,480 at 40 pounds, and a gross profit of $6,610.00 at 60 pounds pressure. Now it is not the purpose of these figures to demonstrate that ground wood pulp can be made at a profit under present conditions, because there are any number of expenses connected with the process that have not entered into the discussion. The figures, however, do show the necessity of utilizing every possible advantage. The use of burrs alone will not do the trick, although it is vitally important that the stones be dressed often enough to keep them cutting up to production. The article was written for the purpose of showing the part pressure plays in making ground wood pulp at a profit or at a loss.

TABLE

| | | | |
|---|---|---|---|
| $3,600.00 | $5,800.00 | $8,000.00 | Power. |
| 1,440,00 | ·1,440.00 | 1,440.00 | Labor, 20c, 300 days, 24 hours. |
| 13,800.00 | 25,380.00 | 37,950.00 | Wood. |
| $18,840.00 | $32,620.00 | $47,390.00 | |
| $18,000.00 | $25,100.00 | $54,000.00 | Sales. |
| 18,840.00 | $32,620.00 | $47,390.00 | |
| $840.00— | $2,480.00 | $6,610.00 | |

# Importance of Power Costs in Paper Accounting

By E. C. GAUSE, C. P. A.

Messrs. Haskins and Sells

*Address Before Connecticut Valley Local Division of the Cost Association of the Paper Industry, December 12, 1921*

WHILE proper accounting for power costs is important in any manufacturing industry, it is especially important in pulp and paper manufacturing because of the large amount of power required.

The machinery used in the different processes—especially pulp grinders, barking drums, chippers, beaters, paper machines, etc.—requires a large amount of power. A large quantity of water is constantly being used, the pumping of which requires considerable power. Then there are the conveyors, steam for digesters, steam for drying the paper, steam for heating the buildings, electric current for lighting the buildings, power for the repair shop, etc.

There are three sources of power usually employed in pulp and paper manufacture—steam, electricity and water. Steam is in practically every case generated in an adjacent power plant. Electricity may be either purchased or generated at the plant. Water power, of course, is available only if there is proximity to a stream of water of sufficient size to produce enough power.

The most economical source of power is naturally that obtained from the use of water, but it is rarely the case that there is a sufficient quantity to meet the requirements of all of the operations in a pulp and paper mill, so recourse is had to either steam or electricity, or both, in order to obtain the necessary amount of power.

The usual arrangement from an economical and efficient power viewpoint is probably one in which the grinders are directly coupled to either electric or water power, the paper machines directly driven by either steam, electricity, or water, and the other machinery driven by electricity through direct drive or by line shafting. However, these conditions are

not always met with, as practical paper mill operators differ in their opinions as to the proper application of the different sources of power, and conditions and localities have much to do with the question.

Power expense may be classified as follows:

1. Steam generation.
2. Steam distribution (from central power plant to manufacturing buildings, and then to departments or machines).
3. Electric current generation.
4. Electric current distribution (from central power plant to manufacturing buildings, and then to departments or machines).
5. Electric current purchased.
6. Water.

There are many cases, of course, where there is no central power plant, and steam or electricity, or both, are generated at each manufacturing building, and distributed direct to departments or machines within the building.

Power costs comprise the following elements:

| | 1 Steam | 2 Electric | 3 Water |
|---|---|---|---|
| Wages of power house employes | x | x | ... |
| Fuel | x | Water<br>Steam | ... |
| Water | x | ... | ... |
| Lubricants, waste, etc | x | x | ... |
| Labor and supplies for repairs and maintenance | x | x | x |
| Provision for depreciation of buildings and equipment | x | x | x |
| Insurance and taxes | x | x | x |

The provision for depreciation of water facilities would apply to dams, water ways, water wheels, etc.

Steam is apportioned on the basis of the number of thousand cubic feet generated or on the basis of the number of thousand pounds used.

Electric current is apportioned on the basis of kilowatt hours.

Water is apportioned on the basis of the number of cubic feet used or on the basis of the number of horse power hours.

It is not the intent in this paper to deal with methods of apportionment or distribution of power costs over departments, processes or machines, as that subject has been covered very fully by numerous books and articles; but, as indicated by the title of the paper, I will endeavor briefly to emphasize the importance of ascertaining the correct power costs for inclusion thereof in the detail cost of manufacturing the product.

In this connection, it may be stated that there are no more urgent reasons for ascertaining the correct costs for power used in pulp and paper manufacture than there are in respect of the manufacture of many other products where power is such a necessary and important element of the cost.

No one, whether executive, operator, or accountant, who is interested in the manufacture of pulp and paper, or any other product for that matter, will belittle the importance of ascertaining true costs in respect of direct labor or direct material ("furnish," as it is called in the paper industry), but there is a tendency on the part of many to overlook the equal importance of proper and intelligent distribution over the kinds or classes of goods manufactured, of the overhead charges or burden of which the cost of power usually forms a very considerable part.

Other items entering into overhead charges or burden are superintendence, factory clerks, watchmen, cleaners, repair labor and materials, insurance, and many other items, the cost of all of which cannot be applied direct to a particular kind or class of product but which nevertheless are part of the cost of manufacturing each article produced just as much as the direct labor or the direct material.

It is probably true that in the manufacture of certain kinds of goods, it is difficult, and perhaps prohibitive on account of the cost, to make an exact distribution of the overhead charges, but it is also true that there are too many cases where no intelligent effort is made to distribute these charges and the only basis used is that of the ratio of the total direct labor to the total overhead charges.

Power costs should be ascertained by taking into consideration the elements entering thereinto and a proper monthly distribution made, as in that way only can correct cost be arrived at. Comparisions of properly built up power costs are valuable because of the opportunity presented to detect undue fluctuations and ascertain the reason therefor. The quantity of coal consumed monthly may be checked by the weight of the paper produced, as for example, in newsprint paper approximately three quarters of a pound of coal is consumed in producing one pound of paper.

Inclusion in power costs of correct amounts for depreciation of buildings and equipment, insurance and taxes is only possible where the costs or book values of power buildings and power equipment are known. This data, however, as well as similar data in respect of all other buildings and equipment, should be a matter of record either through the medium of an independent appraisal or from the original cost of the property, or both.

The necessity for having complete information regarding property values is because of the possibility of damage or destruction by fire, and also because of Federal tax laws. Charges for depreciation of property and for depletion of timber lands must be taken into consideration if the taxpayer is to receive the benefits to which he is entitled under the laws, and such charges have to be supported by proof as to property values.

### Uniform Cost System an Advantage

It may not be out of place here to refer to the advantages to be gained from the adoption by manufacturers in the same industry of a uniform cost accounting system. Such a system, if based upon correct principles and properly applied, will go far toward eliminating ignorant and therefore unfair competition, will tend to bring the different manufacturers into closer co-operation, and eliminate feelings of distrust and fear which are all too prevalent in industries where competition is keen and a trade association does not exist or is inactive.

In order to obtain the best results from a uniform cost accounting system, it is essential that certain principles be agreed upon by the manufacturers and strictly adhered to, as otherwise uniformity cannot be obtained. For example, charges for depreciation of property of a similar nature should be made on the same general basis, the question of the inclusion or non-inclusion in cost of production of interest on investment should receive serious consideration, so that all of the manufacturers will treat it in the same manner, and other questions of similar importance must be considered and decided upon in advance.

It is true that conscientious inventory taking is hard work if the stock is large and difficult to get at, and this brings up the question as to whether or not all business concerns in inventorying their stock on hand and closing their books at December 31st, are conforming to their natural business year.

There is but one proper time for taking a complete inventory and closing the books and that date is on the completion of the natural business year, which is when the busy season is passed; when stocks of merchandise are at their lowest so that the cost and the physical and mental work of taking an inventory are reduced to a minimum; and when the financial condition of a business is at its best because of the comparatively small inventory of merchandise on hand, a reduced amount of accounts payable, and large amounts of cash and accounts receivable.

At that time employees are not under such a severe pressure and can co-operate more effectively, and the mill can be shut down in order to facilitate the taking of the inventory without the resultant loss of time and money which might be the case if many orders were waiting to be filled.

The only reference to the question of inventories contained in the Revenue Act of 1921, is Section 203, which is as follows:

"That whenever in the opinion of the Commissioner, the use of inventories is necessary in order clearly to determine the income of any taxpayer, inventories shall be taken by such taxpayer upon such basis as the Commissioner, with the approval of the Secretary, may prescribe as conforming as nearly as may be to the best accounting practice in the trade or business and as most clearly reflecting the income."

The regulations relating to the income tax under this act have not yet been promulgated. Until then Regulation 45 relating to the income tax and excess profits tax under the Revenue Act of 1918 will continue in effect, at least so far as they affect inventories.

As many of you know, a ruling was made in December, 1920, permitting taxpayers to value their inventories at December 31, 1920, at cost, or cost or market whichever was lower, regardless of their practice in prior years; provided that a disclosure of the fact and that it represented a change was brought out in the return. A further provision prohibited future changes in the basis of valuation of inventories except by permission of the Commissioner of Internal Revenue, so that the taxpayer who used the basis of "cost or market" at December 31, 1920, as most taxpayers did—must use that basis at December 31, 1921, unless permission to change has been obtained.

## More About Sulphite Cooking

I HAVE read Mr. P. A. Paulson's reply to my remarks in the November issue with interest.

"The fact that Mr. Paulson means 'Combined' when he speaks of 'Calcium' clears up that question very nicely. I think we all agree that a proper amount of combined $SO_2$ is important and the Forest Products Laboratory should be given full credit for their work on that subject.

"Coming back to the question of high Calcium vs. high Magnesium, I would suggest that we get an expression from some of the thirty odd sulphite mills on this continent who have changed from Magnesium to Calcium within the last five years. Have they noticed that their pulp turned 'harsh and transparent' after making the change? Are they turning out a less high grade pulp today than when they used a high Magnesium Acid?

"Now if a high Magnesium Acid is of such importance, why is it that no mills are changing from Calcium to Magnesium?

"Modern methods have overcome such irregularities in acid making and cooking so familiar a few years ago, and the proper amount of common sense is really of more importance than a specified base.

"Regarding the statement that European mills cook indirect and from two to four times as long as we do, I beg to state from personal investigation that all easy bleaching pulp in Europe is made by the direct method. All Norwegian mills cook direct, while in Sweden, Finland and Germany we find both methods in use, the indirect where low temperatures and strong pulp is wanted. The cooking time varies from ten to eighteen hours, which really is not much variation from what is used for high grade pulp here. O. L. BERGER."

# The Use of Fuel Oil

By T. S. REMSEN

St. Maurice Lumber Company

*Paper Read at the Annual Meeting of the Technical Section of the Canadian Pulp and Paper Association, Montreal, January 25 and 26, 1922*

WHEN we look back not more than ten years and compare industrial conditions then existing with those of today we are amazed; the world we live in is so changed that more than a generation might have passed. It is not so long since wood supplied heat, simple vegetation or animal products the light, and sufficient power could be obtained from natural forces, such as wind and water, or by human and animal effort.

With the growth of civilization, the needs of the community have become more and more complex and to meet these needs an improved supply of heat, light and power has been essential.

It was soon found that these primitive sources and forms of energy were inadequate. Coal took the place of wood as a source of heat, gas distilled from coal became the source of light and mechanical power was obtained from steam generated in coal fired boilers.

The discovery of mineral oil opened up new avenues for the production of energy. It was used first as a source of heat, also of power through the medium of steam boilers. It was only tardily realized that the products of crude oil used as a direct power producer in internal combustion engines provided means of transportation which have absolutely revolutionized the domestic and industrial life of the community.

From the time the first oil well was drilled by Col. Drake in 1859 to the present day practically all the oil has come from wells drilled to varying depths, depending upon the location of the oil sands. Obviously, as the fields grow older, the wells become more crowded, the gas pressure goes down, and initial production of the new wells drilled become less and less year by year. An ever increasing drilling program must be carried out to keep up a constant supply. If the demand continues to increase the price trend would be checked by the development of new oil fields.

The world's supplies of petroleum are today everywhere attracting the attention and serious consideration of Governments and industries. The continued source of supply and control of that industry, the vastly increasing demand for liquid fuel and motive power of all kinds by land and water, for power and lubrication in world factories, for lighting purposes and for surfacing the enormous road mileage which must be maintained are questions of vital interest throughout the world, and Canada points the way to a field of opportunity and effort whose importance to the country as a whole can hardly be exaggerated. The entire consuming world will also find interest in Canada's latent resources of oil and the manifold by-products.

The prospecting and drilling activities in the vast potential oil fields of western Canada are of greater importance than almost any other proposed line of development now being promoted in the Dominion.

Competition with the enormous output of the adjacent United States oil fields has done much to discourage production in Canada. Canada's annual oil production up to date stops short of 310,000 barrels (90 per cent from the Ontario fields). There are, however, oil possibilities in the Athabasca, Peace River of British Columbia, Calgary, Alberta, districts and in New Brunswick and Nova Scotia.

People have feared that before very long the supply would be exhausted. These fears, however, have been proved groundless. There are vast quantities of oil bearing shale rocks, and geologists say that from these shales enough oil will come to supply all the wants for many generations. To obtain the oil, shale is mined like coal and is crushed and heated in retorts, where the oil is driven off.

The foreign fields from which Canada draws crude oil principally are located in Peru (South America), Wyoming, Mid-continent, Texas and Mexico.

## Transportation

The method of transporting the crude, oil (called according to the location. It is the custom, however, to collect all crude produced at the wells in the various fields by means of pipe lines. These lines are divided into two classes as follows:

(a) Gathering lines which collect the crude from the various wells and transport it to a central point, there to be picked up by larger lines known as trunk lines.

(b) Trunk lines transport the petroleum crude oil from the central gathering point either direct to the refineries or, in the case of some crudes, to a seaport, where it is loaded on boats known as tankers and delivered to the refineries, the cost of transporting the crude depending entirely upon the transportation facilities.

## Refining

On arrival of the crude at the refineries it is placed in large storage tanks and from these tanks it is charged currently to what are known as stills, these stills being constructed of steel and are the shape of a cylinder, being about 14′ to 15′ in diameter and about 40′ in length, under which heat is applied to convert the crude into vapor, as each constituent or component part of the petroleum has a specific boil-

ing point, hence it is possible to separate each part by means of fractional distillation. The vapors leaving the still are condensed by passing them through a series of pipes submerged in water and the petroleum distillates which are to be subjected to further distilling and purification are delivered from the condenser to various tanks. Fuel oil is the residual product remaining in the still after the light fractions are taken off.

## Fuel Oil

The B. T. U. value of fuel oil, or the residual product referred to above, varies to some extent according to the grade. The value of the fuel oil supplied by the imperial Oil Limited to the "Smokestack Trade" (power plants) averages between 18,500 and 19,000 B. T. U.'s per pound.

Various methods are used for handling and transporting the fuel oil from the refinery to users. When large quantities are required and the refineries are situated where water transportation is available the fuel oil is handled from the storage tanks at the refinery to boats by pipe line and delivered by tankers to the consignee's tanks or to tanks from which it can be shipped by short hauls by rail. The fuel oil when purchased in smaller quantities is shipped in tank cars, or, when smaller than tank car lots are required, it is filled in barrels, although the latter is an expensive way of shipping this particular grade of oil.

## Storage

The question of oil storage is generally looked upon from one of two extreme angles—either as a most hazardous proposition or as so simple a matter as to be worthy of little consideration. To a certain extent both views are reasonable—the former, if accompanied by gross carelessness; the latter, if over-extreme care is used. Fuel oil is not subject to spontaneous combustion nor will it ignite when in bulk form. The danger is due to the tendency it has to vaporize, under high temperatures and form an explosive mixture with the air. As a rule these will not occur unless the flash point is approximated. The oil in a storage tank should be kept as low as possible and still flow properly for pumping.

The size of storage tank required depends on the quantity of oil to be burned and availability of oil supply. The second factor depends in the location of plant, the method of delivery and the probability of interruptions in delivery which must be carefully considered in determining the number of days' oil supply that should be carried at the plant. The storage should be divided into two or more tanks so as to enable shutting down for cleaning without interfering with operation of entire plant.

In built up districts within fire limits, tops of tanks must be at least three feet below level of fireroom floor. The tank must be covered with soft earth or sand.

One of the largest reinforced concrete underground fuel-oil tanks in existence is located at the plant of the St. Maurice Lumber Company, Three Rivers, Province of Quebec. It is divided into four parts and has a capacity of 160,000 barrels. The tank steamers dock at the company's wharf about 400 feet distant. From this location the ship's pumps discharge the oil at a temperature of about 90° F. through a 12-inch pipe to the storage reservoir. The most important problem in the construction of concrete tanks is to determine properly the concrete mix with the given aggregates that produce an oil-proof, non-porous concrete of high compressive strength unaffected by temperature variations.

To test the oil proofing quality of the concrete, a test box, 3-foot cube, was poured with 9-inch walls; after setting thirty days it was filled with oil and subjected for five days to a pressure equivalent to a 27-foot head or 50 per cent more than working conditions. The box was broken up and the water-proofing was placed on inside of tank walls.

Many power plants are provided with a service tank located under the fireroom floor, in addition to the main storage tank outside the building. The service tank is filled at intervals from the storage tank, and the oil pumps take their supply from the service tank and distribute it to the oil burners.

## Oil to Atomizers

In practically every fuel-oil installation it will be necessary to use pumps to transmit the oil from service tanks to burners. A certain amount of pressure will be required, depending on the class of burners, grade of oil, number of burners to be used and the quantity of oil to be burned. The pressure will also give proper control of oil flow whatever conditions demand. This is done by two duplex piston pumps, one serving as a spare, having strainers in suction and discharge. Between the pumps is a combined receiver and heater for raising the temperature of the oil. In general oil should be heated nearly to its flash point to insure complete atomization.

## Atomizers

Atomizers are devices for reducing oil to vapor and are generally termed burners. The gauge of efficiency by which they are measured is the amount of energy expressed in foot pounds used in the device to reduce a given volume of fuel oil to a vapor and at the same time be capable of manipulation, regulation and adjustment to meet plant or operating conditions. Its efficiency will be influenced by that of the furnace and how, when and where air is admitted and united with the oil vapor and the personal equation.

In one type of burner the steam and oil come in contact, the oil is atomized and the mixture issues from the burner tip ready for combustion. The burner requires for its operation about 2 per cent of the steam generated by the boilers and produces a flat flame, with the result that a considerable portion of the volume of the furnace is not made use of.

The mechanical atomizer of the usual design has a

decided limitation in range. Unlike the steam atomizer, it cannot be operated at low capacity if it is designed for a high one. The burner depends for its atomizing effect on centrifugal force induced by giving the oil a rapid whirling motion in the central chamber of the tip. Means are provided inside the nozzle to give the oil a whirling motion of sufficient intensity to make it fly into a spray as soon as it leaves the nozzle. The pressure should be at least 25 pounds to produce good atomization and it may be increased up to 200 pounds, and a temperature of 150° F. is required to atomize the oil properly.

The principal advantage is that a large quantity of oil can be burned in a furnace of a given volume on account of the nature of the flame produced, also steam is saved which would be used to atomize in the other type of burner and this is of importance in marine work where it means a loss of fresh water as well as a loss of steam.

## Furnaces

The cooling of the gases by their coming in contact with the boiler tubes before the combustion is completed is one of the principal causes of low efficiency in boilers that are forced up to high capacities, and any method of combustion that prevents this occurring tends to improve the efficiency of the boiler.

Complete combustion depends on the extent of mixing the oil vapor with air, time available for such mixing to be complete and temperature in furnace at time of mixing.

Best results are gained by installing the burner so that the direction of the flame is toward an increasing volume of furnace. This will allow free expansion and complete mixing of the oil vapor with the air. To accomplish this in certain types of boilers it might be necessary to install the burners at the rear of the furnace and the checker work under the burners that control the admission of air must be properly designed.

In order to operate oil burning boilers at high capacity it is necessary to provide ample furnace volume. It is possible with steam atomizing burners to burn as high as 6 to 7 pounds of oil per hour per cubic foot of furnace space. Three or four pounds gives best efficiency and 60 to 70 cubic feet per burner will generally give good combustion.

## Hazards

Most accidents in oil burning plants are caused by flarebacks, these usually occurring when lighting up and can be prevented by frequent inspection of burners and feed piping for leakage. It is good practice to blow steam or air through furnace to drive out the oil vapor before lighting the burners. Occasionally a flame may be extinguished through some accident, at such time valves should be closed immediately before oil has a chance to accumulate and cause back flare.

## Advantages

A few of the advantages in the use of oil as fuel:

1. General cleanliness.
2. High boiler and furnace efficiency.
3. Ability to carry overloads and meet, almost instantly, wide ranges in load.
4. Total absence of smoke, small dust and ashes.
5. Uniform draft and air supply, giving minimum variation in furnace temperature.
6. No loss when stored indefinitely. Freedom from loss due to moisture and absolutely uniform quality, every pound of oil containing the same number of heat units, which can all be converted into heat without waste.
7. Storage in any convenient place.
8. Low cost of handling. The labor required in the operation of an oil fired plant would average two-thirds less than that required in a coal fired plant.
9. Saving in floor space.
10. Economy of construction.

## Disadvantages

1. Difficulty of obtaining oil supplies.
2. Cost.
3. Danger from inflammable vapor caused by oil leakage.
4. Risk of oil leaking into steam side of heater and finally entering boilers.

In discussing the advantages of oil as fuel the question naturally arises as to how it will compare with coal on a cost basis. For purposes of comparison, data were obtained from two plants having similar installations and operating under like conditions of load and climate. These data were taken from actual running conditions at the mills and consequently should form a reliable basis on which to compare the two classes of fuel.

The coal fired plant from which the data were obtained is equipped with eight Babcock & Wilcox water tube boilers installed in batteries of two. Each boiler is rated at 500 horsepower. They are equipped with automatic stokers of the moving chain grate type which permits a very close regulation of the fires. They are also equipped with automatic feed water regulators, superheated coils and economizers. The amount of coal used is accurately weighed and the coal is tested at regular intervals for its basic properties. The flow of steam is measured with "Bailey" meters and accurate records kept.

The oil fired plant also has Babcock & Wilcox boilers, the same size and number, and installed in a similar manner to the coal fired plant. They are provided with efficient oil burning equipment and consequently have a much larger combustion chamber than is used in a coal burning boiler. They also have automatic feed water regulators and superheater tubes, but on account of the low temperature of the flue gases produced in an oil burning plant it has no economizers.

The quantity of oil pumped to the boilers is measured by a registering meter and the total steam generated is accurately measured with recording meters. Meters are used on each boiler to record the temperature of the flue gases, the amount of $CO_2$ in the flue gases, the amount of draught and the steam flow from each boiler.

The following tables have been compiled from the results obtained in the plants described:

**Coal Fired Plant—Basic Properties of Coal**

| | |
|---|---|
| Moisture, per cent | 8.21 |
| Ash, per cent | 12.28 |
| Fixed carbon, per cent | 49.98 |
| B. T. U. | 12,753 |

**Plant Conditions**

| | |
|---|---|
| Steam pressure, pounds | 150 |
| Degrees of superheat, degrees Fahr. | 150 |
| Feed water entering economizer, degrees Fahr. | 174 |
| Feed water entering boiler, degrees Fahr. | 235 |
| Flue gases entering economizer, degrees Fahr. | 526 |
| Flue gases leaving economizer, per cent | 108.7 |

**Operation**

| | |
|---|---|
| Equivalent evaporation, pounds | 8.92 |
| Average hourly production, pounds | 100,000 |
| Over-all efficiency, pounds | 73.8 |
| Steam used in boiler house, per cent | 6.23 |
| Cost per 1,000 pounds steam generated: | |
| (a) Coal | $0.601 |
| (b) Labor | .063 |
| (c) Repairs | .030 |
| Total | $0.694 |
| Cost of steam per 1,000 pounds delivered from boiler house | .737 |

**Oil Fired Plant—Basic Properties of Oil at 60° Fahr.**

| | |
|---|---|
| Moisture | Trace |
| Sediment | Trace |
| Specific gravity at 60° Fahr | .958 |
| Flash point, degrees Fahr | 239 |
| B. T. U. | 18,170 |

**Plant Conditions**

| | |
|---|---|
| Steam pressure, pounds | 110 |
| Degrees of superheat, degrees Fahr. | 100 |
| Feed water entering boiler, degrees Fahr. | 176 |
| Temperature flue gas, degrees Fahr. | 450 |
| Temperature oil at burner, degrees Fahr. | 150 |
| Draught, inches | .11 |
| Average rating, per cent | 108.7 |

**Operation**

| | |
|---|---|
| Equivalent evaporation, pounds | 14.94 |
| Average hourly production, pounds | 41,000 |
| Over-all efficiency, per cent | 79.8 |
| Steam used in boiler house, per cent | 12.98 |
| Cost per 1,000 pounds steam generated: | |
| (a) Oil | $0.419 |
| (b) Labor | .033 |
| (c) Repairs | .006 |
| Total | $0.458 |
| Cost of steam per 1,000 pounds delivered from boiler house | .517 |

The above figures are based on coal at $10.50 per ton in hopper over boilers and oil at $2.30 per barrel delivered in storage tanks.

To illustrate the relative fuel values of oil and coal the following concrete example is worked out, using the data of the foregoing table.

**Coal**—12,753 B. T. U. Moisture, 8.21 per cent. Efficiency, 73.8 per cent. One ton of coal as delivered contains $2,000 \times 91.79 = 1,835.8$ pounds dry coal which contains $1,835.8 \times 12.753 = 23,411,957$ B. T. U. The plant being 73.8 per cent efficient, then $23,411,957 \times .73.8 = 17,178,024$ B. T. U. are turned into useful work.

**Oil**—18,170 B. T. U. Moisture nil. Efficiency, 79.8 per cent. One barrel of oil contains 34 imperial gallons or 336 pounds, or one barrel of oil contains $336 \times 18,170 = 6,105,120$ B. T. U. The plant is 79.8 per cent efficient, then $6,105,120 \times 79.8 = 4,871,885$ B. T. U. are turned into useful work.

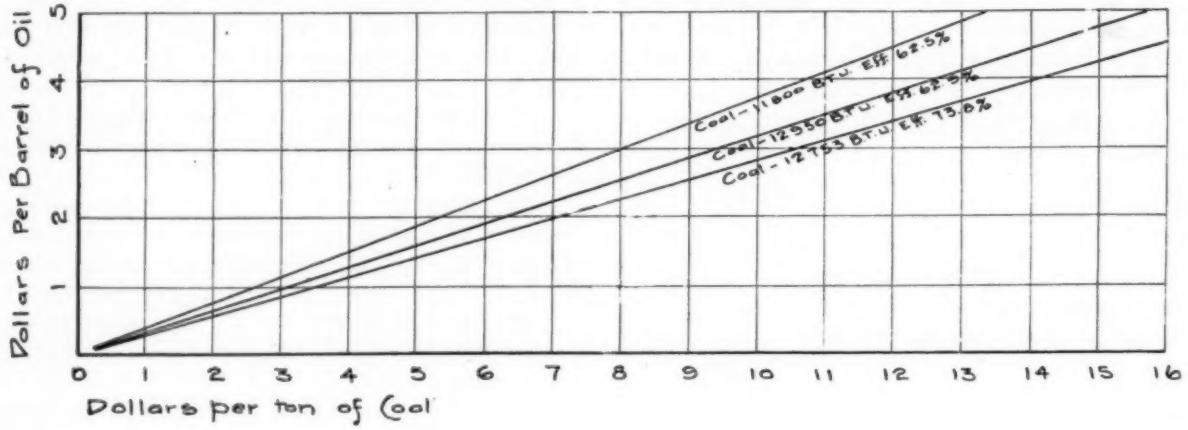
Continuing these figures and applying the cost of each fuel, the following graph has been plotted from which a close approximate ratio between the cost of coal and oil can be determined. In this graph it is assumed that all oil-burning boilers will give an efficiency of 79.8 per cent.

Where it is necessary to operate the plant at no load and be ready to pick up the load at any instant, the boilers must be kept hot even though no steam is generated. With coal fires this is accomplished by keeping a banked fire on the grates. With oil the fire is put out completely, and when the steam pressure in the boiler has dropped as low as permissible, the fire is relighted and the steam brought back to full pressure. During the time the fire is out the damper may be shut tight, thus materially reducing the loss of heat. In a boiler with good, tight dampers the drop in steam pressure will be not more than 10 pounds to 15 pounds per hour.

Approximately fifty textile mills, with over 400 boilers, were converted from coal to fuel oil during 1920, making a total of 145 textile mills in New England and New Jersey, with 850 boilers and 175,000 rated horsepower that are using fuel oil.

Deliveries of fuel oil to merchant vessels in 1920 at Atlantic Coast points totaled 19,326,410 barrels, representing largely Mexican oil. Theoretically the proposed tariff of $1.50 per barrel levied against Mexican oil in the United States would cause the use of domestic oil and stop the importation of the Mexican product. Continued trouble in England with labor and coal production has resulted in systematic attempts largely to substitute oil for coal in British industrial plants. The situation is graphically ex-

plained in the statement that the average annual coal output per miner in Great Britain is 193 tons, whereas in the United States the annual output per miner is 889 tons. British industry cannot successfully compete with this terrific labor handicap. Labor conditions in the oil industry have always been stable and dependable. With an embargo against the use of Mexican oil in the United States, Great Britain can profit immensely by the near monopoly of Mexican oil they would enjoy.


Dollars Per Barrel of Oil
1
2
3
4
5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Dollars per ton of Coal
Coal - 11800 B.T.U. Eff. 62.3%
Coal - 12550 B.T.U. Eff. 62.5%
Coal - 12733 B.T.U. Eff. 73.6%

# Use of Clean Water as a Preservative for Storing Mechanical Pulp

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*Paper Read at the Annual Meeting of the Technical Section of the Canadian Pulp and Paper Association, Montreal, January 25 and 26, 1922*

RED-ROT and moulding in pulp while in storage occur so frequently that every one who has ever stored pulp is familiar with this source of loss and waste. Until a short time ago, very little had been done towards solving the problem and finding a way to control the trouble.

## Moulds and Fungi to Blame for Losses

The various forms of pulp deterioration are due to the action of wood-destroying fungi and moulds. Each type of trouble-maker is a simple kind of plant and each is able to nourish itself with the substance of the pulp. In order to develop properly, the fungi and moulds have other requirements in addition to food. They must have air, a proper amount of moisture and sufficient warmth.

If we undertake to keep our pulp free from attack by any of these invaders, it is necessary to store the material in such a way that one or more of the requirements of the mould or fungus plant will be lacking. The food material for the organism may be poisoned by spraying the pulp with a preservative substance. Experiments in this direction have been carried out at the Forest Products Laboratory at Madison, Wisconsin and also at the Kenogami Mills of Price Brothers and Company. A large number of chemicals was used and the results of the experiments indicated that some of the materials employed were satisfactory and could be used commercially at a reasonable cost. However, if one adopted such a method of handling pulp for storage it would require the use of new raw materials and extra labor and equipment. Finally the paper maker might object to the presence of objectionable chemicals in the pulp.

It seemed that some of the other necessary conditions for fungus development lent themselves to experimental study, and it was decided to find out something about the moisture requirements of the moulds and fungi. Any of the ordinary plants which grow in our gardens must have a certain amount of moisture in order to develop properly. If the supply of water is too scant the plant withers up and dies, while if there is too much moisture the plant is drowned. The same would be expected to hold true in the case of the organisms which injure pulp. Therefore pulp stored with either too little or too much moisture to permit of fungus development should be safe from attack.

## Experiments with Wet Storage

It thus remained to make a choice of experimenting with pulp either too dry or too wet to spoil. When dried too much ground wood is weakened and is apt to be lumpy when beaten. Storage conditions in a state too wet to spoil remained as a field for experiment.

Facts already known indicated that such methods of storage were well worth a trial. It is an accepted fact that wood which is immersed in water or is

covered with water-saturated soil is not destroyed by agencies which bring about ordinary decay. Wooden piles which were used for supporting the homes of prehistoric Lake-Dwellers have been recovered in good condition from some of the Swiss lakes. On this continent trunks of trees removed from beds of rivers, where they had remained undisturbed for hundreds if not thousands of years, have been converted into merchantable lumber.

When made into groundwood pulp the only change brought about in the wood is to separate it into fibres or small fibre bundles, and it would be reasonable to expect that if stored in water in this finely divided condition there should be no more tendency for it to rot or mould than in the instances just cited. Accordingly an experiment was planned and equipment made for carrying on the work. A number of tanks were built in each of which several laps or sheet of pressed pulp could be placed. For each tank there was a valve for supplying water as required. Each tank was provided with a combined plug and overflow pipe which either permitted the water to drain away quickly or prevented the tank from overflowing when water flowed into it continually.

In June, 1920, the experiment was started and several lots of groundwood were placed in the tanks. Pulp was used in the form of slush, laps and pressed sheets. In some of the tanks the water was changed

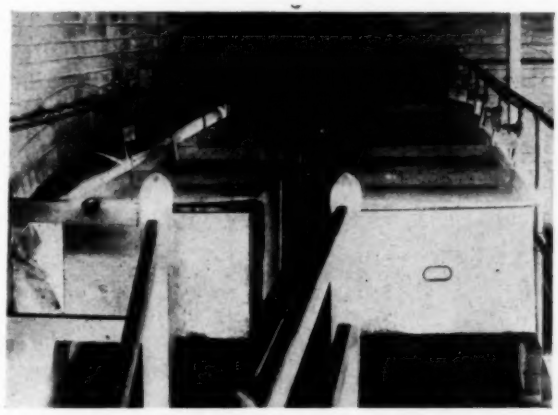


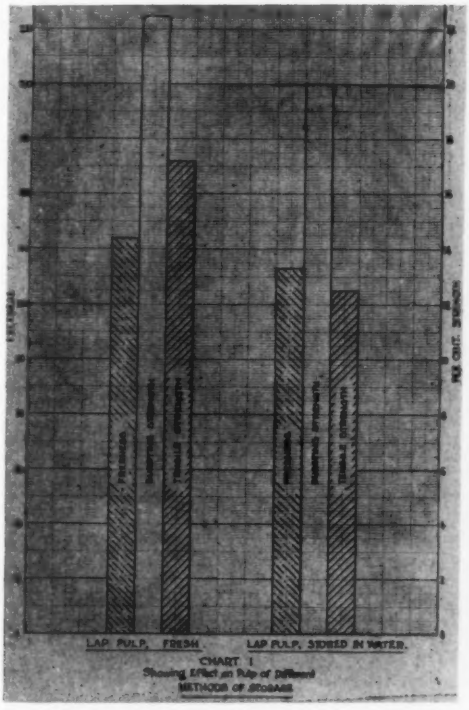
*Fig. 1—Ten of the tanks used for holding pulp stored in water*

once a week, in others the change was made every day, while in the remaining tanks water entered in a small stream which was never shut off.

In appearance the stored pulp was quite attractive as it was clean and similar to freshly-made pulp. On the surface there was an accumulation of a dark colored slime, but this material was entirely superficial and did not penetrate into the body of the pulp. At the time the experiment was started some pulp was left over which was not required. During the time the experimental pulp was in storage these extra laps remained in the same room. They deteriorated so seriously that at the end of the storage period they offered no fair basis for comparison with the pulp stored in water.

## Cold Storage Experiment

In addition to the water storage experiments, another one was tried at the same time with pulp in cold storage. Laps of three different kinds of freshly made groundwood were crated up and sent to a cold-storage warehouse where they were held at a temperature of from 34° to 36° F. during the same interval of seventeen months. At the end of that time, this lot was tested in a similar way to all of the other lots. The results obtained from these tests are to be found in the tables and charts which accompany this paper.




## Methods of Testing

The tests carried out consisted of determinations of freeness, bursting strength and tensile strength.

## Sampling

An average sample was taken from each tank of stock, thoroughly stirred, and the consistency of it determined in the following manner.

One thousand grams of stock were accurately weighed out in a tared beaker on a large chemical balance. The stock was then poured on to a large Buchner funnel and the water drained off by suction, a piece of well washed bleached calico being used as the filtering medium. The pat thus formed was transferred to a large clock glass, the calico carefully stripped off, and the pat dried in an oven for three hours at 100°, 105° C., cooled in a desiccator, and weighed.

From the consistency thus obtained, the original sample was diluted to 5 per cent and transferred to the disintegrating machine.

## Disintegration

The disintegrating machine consisted of a three-inch propeller driven at a high rate of speed (1,700 r. p. m.), inside and close to the bottom of a large inverted bell jar. The object was to open out the stock without any appreciable beating action.

This was found to be best accomplished by means

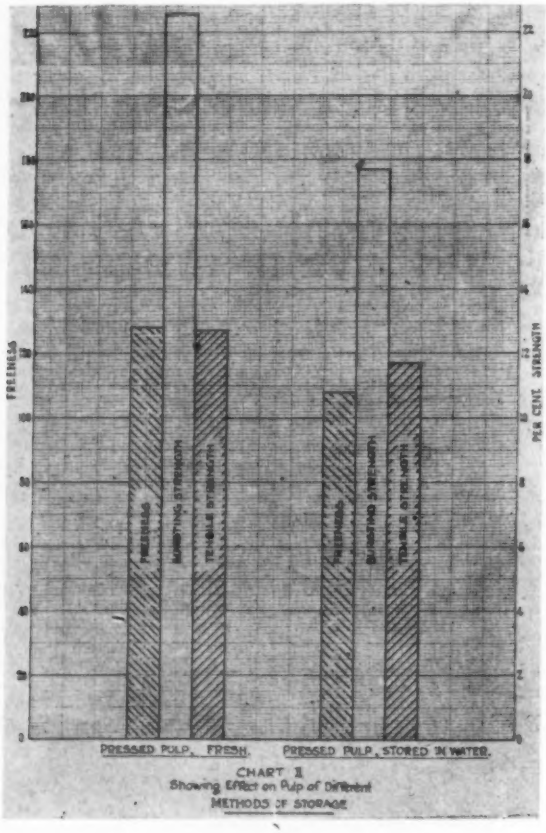



CHART I
Showing Effect on Pulp of Different
METHODS OF STORAGE

of a treatment of twenty minutes, six litres of 5 per cent stock being used in the machine. This method was adopted as uniform for all pulps used, so that the beating action, if appreciable, would be constant for all samples.

After disintegration, the sample was carefully diluted to 0.5 per cent consistency by weighing. It was then ready for the freeness tests and the preparation of the test sheets.

## Determination of Freeness

All freeness tests were carried out at a constant temperature of 20° C., which was maintained by means of a small copper steam coil, and frequent stirring. The freeness tester employed was a modification of the Green apparatus installed in the laboratories some years ago. The procedure was as follows:

One thousand grams of 0.5 per cent stock were carefully weighed out and transferred to the chamber of the tester, the top screwed home, and the pet cock in the lid closed. The apparatus was then placed in its rack over the funnel, a graduate placed under the side discharge of the funnel, the bottom of the chamber released as quickly and uniformly as possible, the pet cock in the lid opened, and the stock allowed to drain.

Five tests were run for each tank of stock and the conditions of each test kept as constant as possible throughout the whole series of determinations.

After the flow from the side discharge had ceased, the stock was transferred to a fibreware pail, the chamber of the apparatus thoroughly rinsed into it, the discharge from both orifices of the funnel also added, the whole diluted to approximately five litres and poured into the sheet machine.

## Preparation of Sheets

The sheet machine used was one made from the plans of K. G. Wilen, of the Wayagamack Pulp & Paper Co., and described by him at the last annual meeting of this section on January 19, 1921. One slight modification was introduced, that of making the screen plate separate from the body of the machine, thus facilitating the changing of the wire when necessary, but in no way affecting its efficiency. During these tests and throughout a large number subsequently carried out the machine has proved highly satisfactory and it will probably be found difficult to improve upon materially as a device for making standard test sheets.

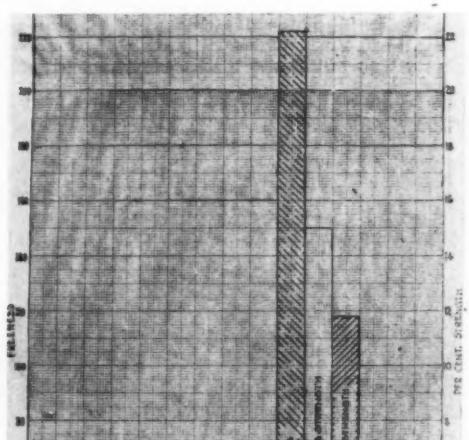



CHART II
Showing Effect on Pulp of Different
METHODS OF STORAGE

It is unnecessary to describe this machine in detail here as a complete description of it may be found in an article by Mr. K. G. Wilen in the Pulp and Paper Magazine for January 20, 1921.

After pouring the stock into the chamber of the machine as described above, it was allowed to stand

until all eddy currents had ceased. The valve was then opened and the sheet formed on the wire. The sheet was couched off on a piece of machine felt and both sheet and felt were placed on a piece of heavy brass plate. A second piece of felt was placed over the sheet and another brass plate laid on top of all. The whole was then put into a flat press with the press as hard down as it was possible to turn it.

After pressing, the brass plates and one felt were removed, and the sheet allowed to become air-dry while remaining on the other felt. This was done because the weakness of the sheet while wet rendered its removal from the felt without damage extremely difficult. The sheets were allowed twenty-four hours drying on the felts and an additional twenty-four after being removed and before being tested.

The sheets being thoroughly air-dry were cut to a seven-inch square and carefully weighed. From this weight the ream weight was calculated, taking a ream as 480 sheets, 24 inches by 36 inches.

## Methods of Testing

A strip one inch in width was ruled diagonally across the sheet and reserved for the tensile tests,

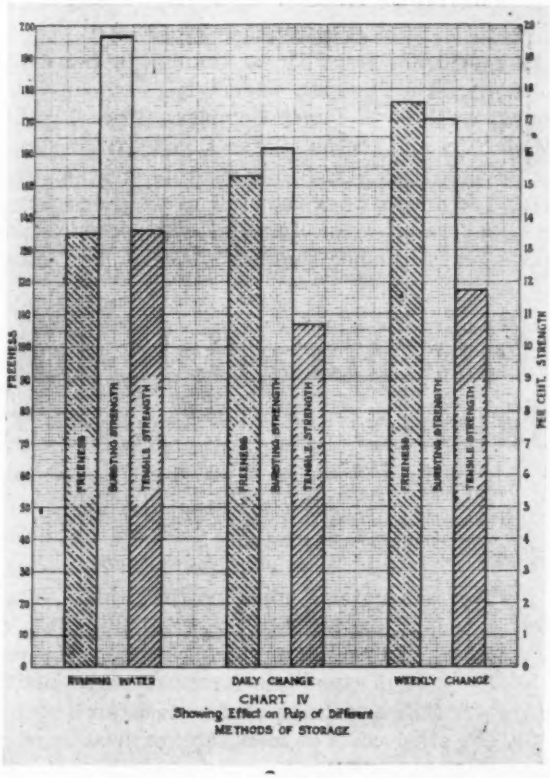



CHART IV
Showing Effect on Pulp of Different
METHODS OF STORAGE

the remainder of the sheet being used for bursting tests.

Five bursting tests were made on each sheet by means of a Mullen machine, thus giving an average of twenty-five bursts for each lot of pulp. The percentage points per pound as calculated in the usual manner.

The tensile strength was determined on a small machine designed by Mr. L. N. Seaman, formerly of these laboratories, and described by him in an article in the Pulp and Paper Magazine October 2, 1919. The machine, though somewhat crude, gave at least comparative results for the different lots tested. It is well to point out that the results of the freeness and tensile tests are only of value for comparison in the work actually carried out. Freeness testing is anything but standardized at present and the results of

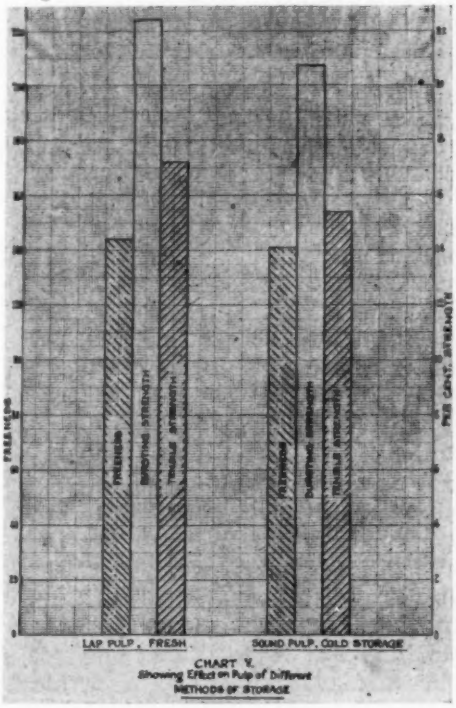



CHART V.
Showing Effect on Pulp of Different
METHODS OF STORAGE

our method of tensile testing can in no way be compared with those obtained, for instance, by a Schopper instrument under the same conditions.

The method of computing the tensile strength is perhaps rather unusual, but it is simply a calculation similar to that of percentage points per pound from bursting strength. This method gave a figure which could easily be plotted and is not, we think, fundamentally unsound.

## Presentation of Results

Table No. 1 presents in detail average figures obtained from each lot of stock for all the tests made. Table No. 2 groups the results and presents the averages for the various groupings selected. Table No. 3 summarizes the results presented in the charts.

**Table No. 1—Groundwood Pulp Storage**

| Condition of Pulp. | Sort of Storage. | Result of test for: Freeness | Bursting | Tensile |
|---|---|---|---|---|
| Lap | Running water | 129 | 23.06 | 13.91 |
| Lap | Water changed daily | 133 | 18.55 | 11.59 |
| Lap | Water changed weekly | 137 | 18.72 | 11.72 |
| Pressed Pulp | Running water | 117 | 18.65 | 13.11 |
| Pressed Pulp | Water changed daily | 94 | 16.87 | 9.59 |
| Pressed Pulp | Water changed weekly | 115 | 17.78 | 12.45 |
| Slush—Stirred up daily. | Running water | 276 | 14.69 | 11.13 |

| | | | | |
|---|---|---|---|---|
| Slush | Water changed daily | 231 | 13.03 | 10.55 |
| Slush—Undisturbed | Running water | 159 | 17.25 | 13.75 |
| Fresh Lap | | 144 | 22.42 | 17.20 |
| Fresh Pressed Pulp | | 128 | 23.62 | 17.72 |
| Laps in cold storage | | 141 | 20.72 | 15.40 |

**Table No. 2—Groundwood Pulp Storage**

| Description of Storage | Results of tests for: Freeness | Bursting | Tensile |
|---|---|---|---|
| Pulp laps in water | 133 | 20.11 | 12.52 |
| Pressed pulp in water | 108 | 17.76 | 11.72 |
| Slush pulp in water | 222 | 14.99 | 11.81 |
| All pulps in running water | 135 | 19.65 | 13.50 |
| Pulp in water changed daily | 153 | 16.15 | 10.69 |
| Pulp in water changed weekly | 176 | 17.06 | 11.76 |
| Pulp in cold storage | 141 | 20.72 | 15.40 |
| Fresh lapped pulp | 144 | 22.43 | 17.20 |
| Fresh pressed pulp | 128 | 23.62 | 17.72 |

**Table No. 3—Summary of Material Presented in Charts**

| | Freeness | Bursting | Tensile |
|---|---|---|---|
| 1—Lap Pulp: | | | |
| Fresh | 144 | 22.43 | 17.20 |
| Stored | 133 | 20.11 | 12.52 |
| 2—Pressed Pulp: | | | |
| Fresh | 128 | 23.62 | 17.72 |
| Stored | 108 | 17.76 | 11.72 |
| 3—Slush: | | | |
| Fresh | ... | .... | .... |
| Stored | 222 | 14.99 | 11.81 |
| 4—Stored in running water | 135 | 19.65 | 13.59 |
| Stored in water changed daily | 153 | 16.15 | 10.69 |
| Stored in water changed weekly | 176 | 17.06 | 11.76 |
| 5—Lap Pulp: | | | |
| Fresh | 144 | 22.43 | 17.20 |
| Cold Storage at 34° to 36° F. | 141 | 20.72 | 15.40 |

## Summary and Conclusions

1.—Of the pulp received only part was stored in water. The remaining laps and sheets were left in the building with the storage tanks and were freely exposed to the air. After seventeen months this latter material was found to be in very bad condition.

2.—Table No. 3 gives actual figures for the results shown in the charts. A comparison between fresh lapped pulp and that stored in water shows that after seventeen months there was slight deterioration in all cases. For pressed pulp the same condition held but was more noticeable.

3.—In stored slush stock the freeness was much higher than in the case with either laps or pressed pulp stored for the same length of time under the same conditions and the strength tests were also somewhat lower.

4.—In making a comparison between different methods of water storage, running water apparently gave a better result than either a weekly or daily change.

5.—In cold storage little deterioration seems to occur.

6.—The results indicate that water storage is superior to air storage for groundwood pulp.

## Acknowledgments

In conclusion we wish to thank the Laurentide Company, The Belgian Industrial Company, The Donnacona Pulp & Paper Company, Price Brothers & Company and the MacLaren Company for supplying the pulp used in carrying out this series of tests; also those members of the staff of the Forest Products Laboratories of Canada who prepared the charts, and furnished suggestions as to carrying out the experiments.

# Plants Suitable as Raw Materials for Paper Making

By RAYMOND FOURNIER

Translated from "Le Papier," XXIV, 116-118 (March, 1921)

By A. Papineau-Couture.

THEORETICALLY, most plants can be used for paper making; but such is not the case in practice. In order that a plant may be used for the production of paper pulp, it must meet the following requirements:

1—Its value, including harvesting and transportation costs, must be appreciably lower than that of the woods commonly used for paper making.

2—The supply must be sufficient throughout the whole year to meet the demand of a mill.

3—The yield of fibrous pulp (not necessarily bleached, for other than white papers are used) must be greater than 25% of the dry weight of raw material.

4—The raw material must not be injured to any great extent by exposure to the weather, as it is out of the question to think of storing it under cover.

5—The cost of chemicals for treatment must not be greater than for the treatment of straws.

6—The other costs of manufacture must be of the same order as for straw.

7—The ratio of the diameter to the length of the fibrous cells should not be much greater than 0.02.

The following plants, among others, are suitable for the purpose:

ESPARTO (**Stipa tenacissima**):

| | |
|---|---|
| Cellulose content | 45-48% |
| Caustic consumption | 10-15% |

Diameter of fibers..... 0.012 mm.
Length of fibers..... 1.5 mm.
Ratio Diam./Length..... 1/125

BAMBOO (**Gramineae-Bambuseae**):
Cellulose content..... 40-50%
Caustic consumption..... 8-12%
Diameter of fibers..... 0.015 mm.
Length of fibers..... 8 mm.
Ratio Diam./Length..... 1/533

HEMP (**Urticaceae-Cannabineae**):
This material is used in the form of waste from carding mills, which is useless for other purposes owing to the large amount of stalks which it contains.
Cellulose content..... 25-30%
Caustic consumption..... 10-12%
Diameter of fibers..... 0.022 mm.
Length of fibers.....20 mm.
Ratio Diam./Length..... 1/909

FLAX (**Linum usitatissimum**):
Cellulose content..... 25-30%
Caustic consumption..... 10-12%
Diameter of fibers..... 0.017 mm.
Length of fibers.....30 mm.
Ratio Diam./Length.....1/1,765

JUTE (**Corchoris capsularis**):
Cellulose content..... 25-85%
Caustic consumption..... 3-15%
Diameter of fibers..... 0.015 mm.
Length of fibers..... 4 mm.
Ratio Diam./Length..... 1/266
This material is used in the form of the stalks of the plant, but chiefly as old bagging.

STRAWS (**Gramineae**): Wheat, Rye, Oats, Barley, etc.

| | Wheat | Rye | Barley | Oats |
|---|---|---|---|---|
| Cellulose content..... | 46 | 47 | 50 | 46.5 |
| Caustic consumption... | 10-14 | 10-14 | 10-14 | 10-14 |
| Diam. of fibers (in mm.) | 0.021 | 0.014 | 0.013 | 0.015 |
| Lgth. of fibers (in mm.) | 0.315 | 0.216 | 0.163 | 0.317 |
| Ratio Diam./Length.... | 1/15 | 1/15.42 | 1/12.53 | 1/21 |

PAPYRUS (**Cyperus papyrus**):
Cellulose content..... 30-40%
Caustic consumption..... 6-12%
Diameter of fibers..... 0.0115 mm.
Length of fibers..... 1.5 mm.
Ratio Diam./Length..... 1/130

PHORMIUM (**Phormium tenax**):
Cellulose content..... 60-85%
Caustic consumption..... 3- 6%
Diameter of fibers..... 0.018 mm.
Length of fibers..... 3 mm.
Ratio Diam./Length..... 1/166
Used in the form of old bagging and wrappings.
Plants suitable as raw materials for paper making.

AGAVES, ALOES (**Amaryllideae**):
Cellulose content..... 70-85%
Caustic consumption..... 3-10%
Diameter of fibers..... 0.016 mm.
Length of fibers..... 3 mm.
Ratio Diam./Length..... 1/187
This is used in the form of old cordage and twine.

REEDS:
Cellulose content..... 30-40%
Caustic consumption..... 10-15%
Diameter of fibers.....0.013-0.025 mm.
Length of fibers..... 2-5 mm.
Ratio Diam./Length.....1/153-1/200

BROOM (**Spartium Junceum**):
Cellulose content..... 25%
Caustic consumption..... 8-15%
Diameter of fibers..... 0.02 mm.
Length of fibers..... 10 mm.
Ratio Diam./Length..... 1/500

NETTLE (**Urtica ureus**):
This is very abundant and was used by the Germans as a cotton substitute during the war.
Cellulose content..... 27%
Caustic consumption..... 14%
Diameter of fibers..... 0.04 mm.
Length of fibers..... 20 mm.
Ratio Diam./Length.....1/500

SORGHUM (**Sorghum vulgare**):
Cellulose content..... 35%
Caustic consumption..... 10-12%
Diameter of fibers..... 0.015 mm.
Length of fibers..... 4 mm.
Ratio Diam./Length..... 1/266

MAIZE:
Cellulose content..... 20-35%
Caustic consumption..... 4-12%
Diameter of fibers..... 0.02 mm.
Length of fibers..... 4 mm.
Ratio Diam./Length..... 1/200

SEAWEED (**Zostera marino**):
Cellulose content..... 15-25%
Caustic consumption..... 10-12%
Diameter of fibers..... 0.006 mm.
Length of fibers..... 3 mm.
Ratio Diam./Length..... 1/500

## Testing Blotting Papers

The Bureau of Standards, Washington, in its monthly report has the following to say in regard to tests of blotting paper made by the Bureau: "An investigation of methods of testing blotting paper has been completed. The various methods now in use for testing blotting paper were studied, and it was shown that these did not give information that represented the true value of such paper for blotting purposes. Since the most satisfactory test for paper is always that which most closely approximates actual practice, including the testing methods employed in commercial work and the use of paper by the consumer, this whole study would seem to prove that an ash test with a consideration of the rag content, the remainder being chemical broad leaf fibre, is far better than any absorption test."

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# Michigan Superintendents Hear Interesting Paper on Cotton Rope Drives at South Bend Meeting

ONE of the features of a meeting of fifty paper mill superintendents at the Oliver Hotel, South Bend, Indiana, January 21st, was a general discussion held following the dinner, of paper mill practice in general, and a discussion covering the utility and practicability of cotton rope in paper mill practice.

The paper mill superintendents were specially fortunate in having with them at the dinner Mr. J. Melville Alison, of England, who is affiliated with the William Kenyon & Son, Ltd., of Dukinfield, near Manchester, England, who are the largest manufacturers in the world of cotton rope and whose

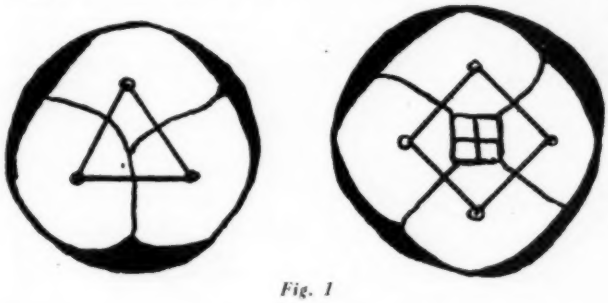

*Fig. 1*

product is distributed in the United States and Canada by the Dodge Sales and Engineering Company, of Mishawaka, Indiana.

Cotton rope for the transmission of power is a subject of vital interest to the paper industry and Mr. Alison's talk was followed with the closest of interest by all those present, and following his talk there was a general discussion in which many questions were answered by Mr. Alison. He said in part as follows:

"The subject of ropes for power transmission has been given very close attention and consideration in England, and this subject has been given very close technical and practical consideration from an engineering standpoint, the results of

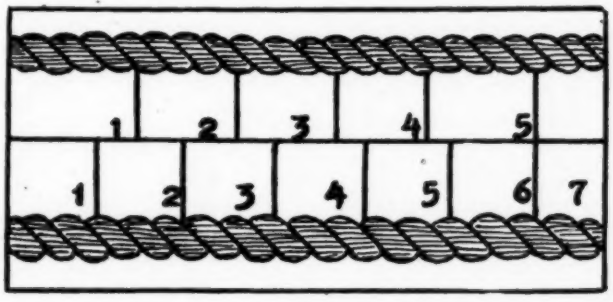


*Fig. 2*

which are of direct interest and benefit to paper mills superintendents and engineers in the United States.

"At the outset let me indicate the reasons why power users in Great Britain have expressed a decided preference for cotton rope all over other materials. The dominating factors back of this preference incorporate the unusual longevity plus the factor of extreme efficiency. It is not at all unusual to find cotton rope doing night and day duty for a period of twenty years or over. Too much stress cannot be laid on a comparison of initial cost, for although cotton is more expensive than manila, its superior resilience, grip and groove impact add so greatly to the driving force that up to approximately one-third more horse power may be transmitted. Further, its prolonged life being reckoned at approximately five to one will reduce apparent excessive first charges to an insignificant item. Aside from this, productions-stoppage for replacement or takeup of manila ropes must be figured as a great argument in favor of cotton ropes, which seldom require further attention after initial installation. An additional proof of the superiority of cotton rope lies in the fact that in England the manufacturers of manila rope themselves use cotton rope to transmit their power.

"The tensile strain of driving rope does not enter largely into the problem, else manila would ultimately hold the field, but its fibers are of so harsh and wiry a nature that they do not take kindly to the successive bending operations, nor do they cling to the sheaves with the tenacity of a softer material. Having but little natural resilience, the strands rubbing one upon the other set up an internal abrasion which not only proves an inconstant quality but invariably leads to repeated

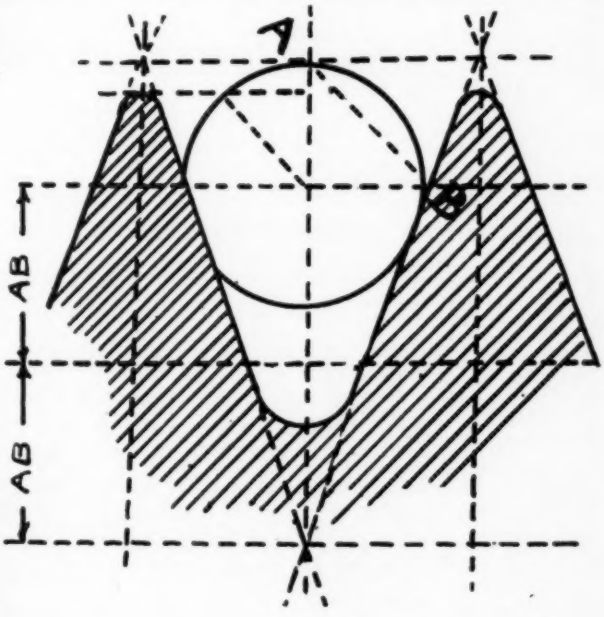


*Fig. 3*

tightenings. While on this phase it might be pertinent if I were to ask you if you ever saw a manila belt. You know that you have not, but on the other hand you have often seen and used cotton belting.

"I have been asked tonight to explain the advantage held by three strand rope over the four or any other construction. Examining the section of a three strand rope (Fig. 1) we obtain an equilateral triangle by connecting the centers of each strand, demonstrating the triangulation of the strains, a principle adopted by all engineers in erecting angular constructions, such as bridges, etc. In a rope of this construction we have a trinity of elastic spirals, so supple that they will bend to and fro without disturbing their formation. With the four strand rope, adopting the same method of connecting the strand centers, we obtain a square and an illustration of the parallelogram of forces from the four centers. Again the four strand rope cannot be constructed without a supporting core, and since this is indispensable to its construction, its collapse must mean the dislocation of the whole structure, and

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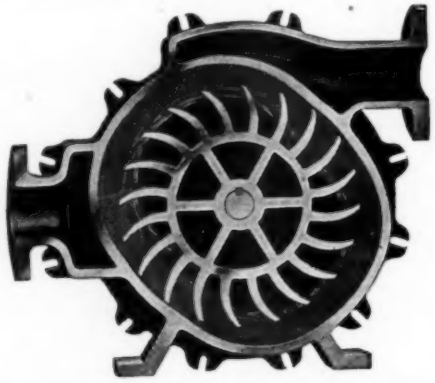

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as the core represents only about one-fortieth of the area, it may be reasonably assumed that the superior force exerted by the alternate contraction and extension of the spiral as the rope passes over the sheaves, must tend toward the breaking up of this core, the period of endurance being limited by its elasticity and the tension at which it is laid. This is what actually takes place.

"This will probably be the more readily grasped by referring to Fig. 2, which shows a three and four strand rope in parallel, with the turns of one strand indicated by the figured lines. Thus the turns of the three strand gradually gain upon the four in the proportion of one in five, or in other words, six turns of the three strand occupy the space of five turns on the four strand; i.e., in ropes of the same thickness. The strand spiral of a seven strand rope is nearer the straight line, being almost double the length of a three strand rope.

"It will, therefore, be acceptable that the medium engaging the greatest number of turns should prove to be the most resilient and more capable of disposing of the shocks and stresses set up, for instance, in rolling mill work, than in any other. Again, as effecting the bending capacity of the rope, another important difference is observable—only two strands appear between every turn of a three strand, while three occupy the spaces between every turn of a four strand.

"In laying out a groove, it should always be borne in mind that a rope is to all intents and purposes an elastic wedge and reaches its highest driving capacity when it is pressed to the shape of the groove itself. This cuneiform ought, therefore, to be anticipated, for if the sides of the groove are merely shown as tangent to the circle, representing a given size of rope, and this is so with all American illustrations I have seen, then there is always a danger of making the groove too shallow, so that when the compression takes place, and possibly after a short term of running, the rope is liable to find its way to the bottom of the groove, when gripping is considerably weakened and slipping takes place, the true indication of which is heated sheave rims. Grooves with curved sides have proved not only hindrance to driving force, but also a stimulus to that destructive rolling action which is the very antithesis of good practice, and should, therefore, always be discouraged.

"Hence, curves being disallowed, permit only the angular groove, and we contend that the rope should decide the angle of the groove and not the groove of the rope.

"Without use of the protractor, the groove demanded by a given size of rope, may be set out as shown in Fig. 3.

"First set a circle of equal diameter to the rope, draw the vertical and horizontal center lines. The chord of the arc AB is then marked off. This becomes the unit measurement and when laid off downward along the vertical line from the center of the circle, indicates the center of the curve of the bottom of the groove. Laid off a second time from this center, the apex of the inverted angle of the groove is determined. This angle always comes out at about 40 deg., whatever the size of the rope may be. Extend the lines of the angle through BB, cutting off segment of the circle on the way, until they intersect the upper horizontal line at CC, which points fix the radii of the mid-flanges. This groove may be taken as a standard for ropes over a 1-inch diameter and also shows the approximate actual compression which takes place in a rope at work.

"The value of good grooving cannot be too strongly advanced. A further great benefit to be obtained in successful transmission is by polishing the grooves. It is difficult to understand why the engineer has not seen to this being done here, since it must be a grievous fact to him to know that his second set of ropes will do no better than his first, pointing to the fact that the first set are expected to polish the tool marks from the grooves.

"It has been a matter of education in England to get the engineer to agree as to whether the fixed-wedged or revolving rope is the better driving medium. The wedged rope with its angular formation gains in groove contact over the revolving rope, and contact means power. Further, the wedged rope cannot have the tendency to slip which the revolving ropes would have, and also the life of the revolving rope is considerably reduced. The cause of ropes revolving is difficult to ascertain, but it is computed that the life of a rope is reduced by at least one-third when it revolves.

"Ropes which are underworked will very often tend to revolve, a golden rule in rope transmission being that the ropes like work to do.

"Perhaps the most apt illustration of a wedge-shaped medium is the drive on a motorcycle, which a V-shaped belt is fitted to a V-groove, without, however, the belt reaching the bottom, yet obtaining the greatest possible groove contact and impact.

"Sheave diameters have a very important bearing upon the question of rope drive efficiency, and while in England the minimum standard is taken as approximately thirty times the diameter of the rope, in America forty to fifty times is the accepted practice. This, however, is largely a question of speeds, as for instance the one-half inch rope will run comfortably over a four-inch sheave at 1,000 feet per minute, a one-inch rope over a twenty-two inch sheave at 3,000 feet per minute, and it is only when the speed rises to 5,000 F.P.M. that we meet the thirty times rule for one-inch rope. Here again cotton scores over manila, since its softness readily admits of superior bending properties, while the native harshness of manila and almost the entire absence of resilience compel a higher minimum sheave diameter to which ropes of this material can be bent over.

"Cotton ropes are also less susceptible to atmospheric changes than manila for the reason that moisture more readily evaporates through the fibers, thus rendering them practically immune from internal mildew which so often is apparent in the discarded manila rope.

"In evidence of this quality of the cotton rope, it might be stated that these ropes are used exclusively in England by canal boats and all boats engaged in towing and where ropes are subjected to frequent contact with water.

"Allowing the claims in favor of the three strand rope without further advocacy of the general principle involved, it may be logically contended that if such a rope possesses constant equality throughout, if the yarns are equal in count, number tensile strength, and tension each one following its appointed track without deviation, and all are of the best procurable quality, then, we have arrived at a point bordering on perfection in making of driving ropes, and their manufacture and application has been a close study for over 50 years.

"This rope is made expressly for power transmission from the finest selected American yarns. Each of the three layers is made up of a succession of sheaths or layers of yarns, which may be peeled off until the center thread is reached. The rope is machine built, under hydraulic tension so that a perfect and combined tension is secured to each thread, from the moment these threads are led to the machine. The crinkling effect to be found more or less in all rope made by the ordinary method is thereby eliminated.

"As previously stated, the triangulation of strains is secured in three strand ropes and in this particular rope is maintained to the individual threads. This construction means that with the rope at work, each thread takes its relative proportion of duty, and again in wearing only the external layer will show abrasion, leaving the next layer intact. This factor is of significant value, since there are many instances, where say a 1¾-in. rope after years of work is reduced in diameter, but still has sufficient life left in it to enable it to be removed to a drive where ropes of about 1½-in. diameter may be in use.

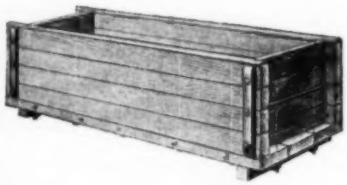
"There is no limit to length in constructing this rope other than may be controlled by convenience in transportation, and to those who have not used cotton rope for transmission purposes, I might say that you will be very pleasantly surprised by the unusual service and trouble-free results which you will secure and maintain through long years of service, if you use cotton rope in your paper mills."

## Secy. Hoover Invited Paper Manufacturers

"The best defensive is an aggressive offensive," a committee of paper manufacturers of the United States told Secretary Hoover, through President W. J. Raybold, of the American Paper and Pulp Association, when they declared that they proposed to meet the competition of European paper manufacturers with an aggressive campaign to retain the existing export business, and to enter the field more extensively. A committee of paper manufacturers had been invited by Secretary Hoover to meet him for a discussion of cooperation between the paper industry and the Department of Commerce, which has just established a Paper Commodity Division in the Bureau of Foreign and Domestic Commerce, and this committee met Secretary Hoover by appointment.

The committee represented various groups of the industry, making different kinds of paper, and included the following: Geo. W. Sisson, Jr., Racquette River Paper Co., Potsdam, N. Y.; Arthur H. Nevius, Miami Paper Co., West Carrollton, O.; R. Frank McElwain, Crocker McElwain Co., Holyoke, Mass.; David L. Luke, West Virginia Pulp & Paper Co., New York City; Chester W. Lyman, International Paper, Co., New York City; James Logan, Pres. U. S. Envelope Co., Springfield, Mass.; Norman W. Wilson, Hammermill Paper Co., Erie, Pa.; Wm. F. Brunner, Pres., Paterson Parchment Paper Co., Passaic, N. J.; Louis T. Stevenson, Mountain Mill Paper Co., Lee, Mass.; C. R. McMillen, Union Bag & Paper Corp., New York City; Phillips Kimball, Liberty Paper Co., New York City; W. J. Raybold, B. D. Rising Paper Co., Housatonic, Mass., president of the American Paper and Pulp Assn., New York City, and Dr. Hugh P. Baker, Executive Secretary of the American Paper and Pulp Assn., New York City.

# KALAMAZOO TANKS



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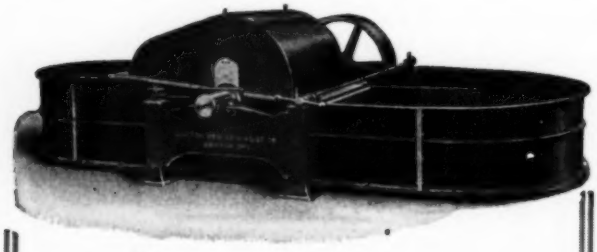

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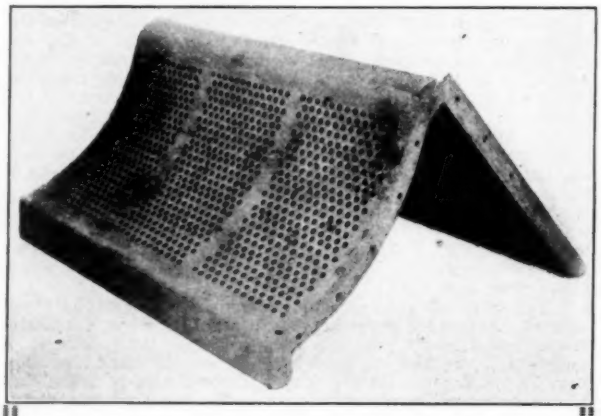

Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

**The Shartle Continuous Beater Company**
MIDDLETOWN, OHIO

# A Safety Contest and Its Results

M. G. HOYMAN

Safety Director, Kimberly-Clark Company

THE big Safety Contest staged by two of the large mills of the Kimberly-Clark Company came to an end January 1, 1922. This contest came about through the challenge from the superintendents of one mill to the superintendents of the other to a three-months' contest, which was promptly accepted.

On the heels of the challenge to a contest came the second proposition here given in full because it was unusual.

**Challenge to the Superintendents of the Kimberly Mill:**

We, the undersigned superintendents of the Niagara Mill, wish to go on record as believing that some prize should be put up for the men to work for in the big Safety Contest which runs from October 10th to January 1st.

With the above idea in view, we hereby challenge the Kimberly superintendents to the following proposition:

That the superintendents of the mill losing the contest agree to buy Mi-Lola cigars for all the men and chewing gum for all the girls of the mill winning the contest.—Answer expected.

(Signed) By all superintendents of the Niagara Mill.

This was also accepted, and then the company stepped in and offered a large championship flag to the winner. This flag was purchased at the beginning of the contest and was on display at first one mill then the other during the progress of the contest.

A likeness of the flag is here reproduced and also the superintendents who finally won out in the contest. But at the time the picture was taken they were just demonstrating for the benefit of the other mill their confidence in the ultimate outcome.

Probably the rules of the contest would be interesting, so we give them in full.

**What Constitutes an Accident**

First. An accident shall be counted when a man injured fails to return to work at the beginning of his next regular tour or shift.

Second. An accident shall be counted when the injured party cannot do his or her regular work.

**Method of Scoring**

Each mill will be credited with 10 points per day or 60 a week.

For each accident at Kimberly 6 points will be deducted.

For each accident at Niagara 7 points will be deducted.

The difference in deduction being from the fact that Kimberly has 100 more employees than Niagara.

The mill having the largest number of points at the end of the contest will be declared the winner.

It should be understood that the challenge, both as to the contest and the cigars was entirely voluntary on the part of the superintendents, and it is safe to say that the results achieved were due to a great extent to the wonderful interest shown throughout the entire contest by the superintendents of both mills.

Boards were erected at both mills showing the daily standings and, although the mills are situated 150 miles apart, they were in touch daily by telephone.

Consultations between superintendents and their foremen were of daily occurrence; bulletins and circular letters were used persistently, and while a great number of N. S. C. bulletins were used, there were some very catchy home-made ones, blue-printed also.

The writer in his experience has never seen such intense and whole-hearted interest in any contest anywhere, and we believe that the sporting element injected into this contest, through he medium of the cigars, can claim a very large share of the credit for the interest making propaganda. I make the claim without reservation that there are few men, if any, that cannot be interested in some kind of a proposition that contains an element of chance.

This very fact is borne out by the figures that show a large portion of industrial accidents happen to the chance-taker.

By utilizing this chance-taking instinct in the right direction, we get an interest in safety that has no parallel. Take the cigar proposition, the men, of course, had nothing to lose but they did have something tangible to gain over the other fellow. That put it on a sporting basis.

Then the superintendents were keenly interested, not because of the amount of money involved, but because each wanted to make the other fellow buy the cigars for his men.

The safety records made during this contest present concrete evidence of the interest taken.

**Result of Safety Contest**

These two mills are large and complete units. By that I mean each has its own wood yard, sulphite, groundwood and everything that goes to turn out the finished product.

They have an employed force of 800 and 700 respectively, or a total of 1,500 employees.

During the period of this contest from October 10th to January 1st, or 12 weeks, the total number of lost time accidents was four, and none of them were hardly more than bruises.

The Niagara Mill with 700 employees having 3 accidents, and the Kimberly Mill with 800 employees having 1.

Although the Niagara Mill lost the big contest, they have a wonderful record when the entire year of 1921 is considered.

At the Niagara plant with an employed force of 700 men, and handling during 1921 approximately 120,000 cords of wood, the safety record is marred by only eleven minor accidents, causing 320 days of lost time. During 1921 this entire working force went one stretch of 69 consecutive working days without a scratch. This record comes out into clear relief when placed against the record of former years. Take 1915, for instance, with the same number of employees, there were 123 accidents causing 1,757 days of lost time. Possibly the most outstanding department is the wood yard which in the year 1915 had 37 accidents and 487 days of lost time. This same department in 1921, handling 120,000 cords of wood, came through the entire twelve months without a single day lost on account of accident.

Kimberly with 800 employees established a record of 70 consecutive days for the entire mill without an accident during the progress of the contest. Again, a background is needed to give such a record proper setting, and we have it in the year 1916, when, for the same period, October 12th to January 1st, 46 accidents were piled up with 1,123 days lost time.

I have been asked a number of times how we are able to make such wonderful safety runs in an industry that has its full share of natural hazards. Just a few words on that score. I shall give but two reasons:

First. The unlimited backing and honest-to-goodness interest taken in safety by the firm members. The Kimberly-Clark Company is one of the large paper companies, and I have no doubt but that the members of this company are as busy as any in the country, but I have yet to recall the instance when anyone of them did not have the time to talk of matters pertaining to the safety or the general welfare of their employees.

As an instance of the interest taken, on the extreme right of the flag picture are two of the directors of the company.

Second. The methods used to interest the men are, I believe, somewhat original, but carefully thought out and based on the psychological effect, and are too extensive to go into here. The results show, however, that the methods employed are right.

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**INCREASED PRODUCTION** **SERVICE ALWAYS**

# Translating Forest Products Investigation Into Profit

IN THE preceding issue of THE PAPER INDUSTRY attention was called to the manner in which a wider application of the results of forest products research could be obtained. By appropriating adequate funds for the carrying on of the work of the United States Forest Products Laboratory at Madison, Wis., it is a recognized fact that great practical results could be accomplished for the economical betterment of the industry.

There are presented in the following paragraphs three important subjects for investigation. The solution of the problem contained in each of them would make an annual saving to the industry of a tremendous amount of money. On another page of this number will be found an article on "The Utilization of Jack Pine in the Manufacture of Newsprint," by Maurice Neilson; it is an exhibition of the results gained by the Belgian Industrial Company, Ltd., of Shawinigan Falls, Canada, from experiments made by them in the use of this wood.

### Jack Pine for Newsprint Paper

The Forest Products Laboratory believes that an intensive study should be made of the possibilities of jack pine for use in the manufacture of newsprint. The rapid depletion of the spruce pulpwood supply is forcing the mills to longer and longer hauls for their wood supply. Many of these mills have adequate supplies of jack pine readily accessible to their woodyards. Many more are located in regions where jack pine could readily be provided by proper forestation. Owing to the rate and the ease with which this species can be reproduced, a relatively small area of forest would provide a permanent supply at the doors of the mills.

The utilization of this species has been attended with some difficulties and still presents a problem which, because of its universal appeal to the industry, should be receiving the concentrated attention of both the industry and the Government. There are two distinct sides to the problem, one economical and one largely technical. That ground wood as well as sulphite pulp can be made from jack pine there is no doubt. The most serious of the drawbacks to its use, however, are the relatively poor color of the pulp and the troubles from pitch. These difficulties are such that it requires a large differentiation in the cost of the wood to warrant pulpmakers using jack pine in place of the commonly used spruce and balsam fir. Its use depends also upon the standard for color of the paper which the buying public will accept, which again is affected by the cost of the pulp.

The pulp and paper industry should be thoroughly canvassed in order to determine what the economic status of the problem is and whether present standards are likely to be continued or to become less rigid, and how far these conditions will permit of the introduction of jack pine, irrespective of any technical improvements in the pulping methods. A thorough understanding of this phase of the problem would be fundamental to an investigation of the technical phase.

The technical phase is the one which will require actual experimental study. As far as consistent with the private interests involved, full information should be obtained regarding detailed difficulties met with by those who have attempted to use jack pine and regarding the methods found useful or suggested as possibly of value in overcoming these difficulties. Once this information is collected and digested an intelligent plan of experiments can be formulated.

Of the two outstanding difficulties already mentioned, color and pitch, the latter is probably the one which should receive first and most detailed attention. The solution of the problem may be sought along two distinct lines. The pitch may be removed or transformed chemically by mechanical treatment or by the action of solvents or chemicals, or it may be rendered harmless by maintaining it in uniform state of dispersion throughout the pulp by some process akin to emulsion or similar colloidal suspension. In the case of groundwood pulp solvent and chemical action offer such a remotely possible solution of the problem that they may be passed over at least during the earlier studies. Mechanical separation of the resinous matter does, however, offer attractive possibilities. Already some success has been met with in attacking pitch problems by the use of rifflers equipped with suitably designed baffles provided with pitch coagulators, such as felt coverings, etc. A thorough study should be made of the whole subject of coagulating the pitch and separating it by gravity from the pulp-water suspension, including the effect of mechanical agitation, settling, temperature, condition of soluble salts in the water, etc. The laboratory study should be followed by the design of equipment and by the installation of experimental units of such equipment in mills that are willing to co-operate.

In the case of the sulphite pulp, a series of cooks should be carried out on a semi-commercial scale, such as may be done at the Forest Products Laboratory, to determine the most feasible conditions of cooking, such as concentration of free and combined sulphur dioxide, the temperature of the cook, and the shape of the temperature curve, the effect of the base—whether lime, magnesia or soda—effect of preliminary impregnation, determination of the end point of cooking, etc.

An investigation of the possibility of maintaining the resins in uniform dispersion through the pulp will involve a study of the effectiveness of colloids, such as clay, in preventing the coagulation of the resinous material as applied to groundwood. The clay may be agitated with the pulp either in the form of white water fed to the grinder, or by means of mixers or pumps after the pulp has been made. The most favorable conditions should be studied. These will include the nature of the clay or other materials, the concentration, temperature, point of application, amount of agitation required, etc. In the case of the sulphite pulp, the possibility of applying the clay or other material prior to the cooking should be studied as well as the effect of the acid concentration at various stages in the process on the added material. Next, the preliminary laboratory tests should be followed by application to commercial operation under conditions which can be accurately controlled.

A still further possibility of controlling pitch troubles is to limit the localization of resins by selecting the time of cutting. Resin localization is greatly increased at freshly-cut surfaces, especially during seasons of high temperature which favor resin flow. If cut during such seasons, the logs accumulate an abnormal amount of resins at the ends. Whether proper cutting would limit this process or control the character of the resins sufficiently to affect pulp manufacture can only be determined by investigation.

To attack this problem in a manner commensurate with its importance, would require at least $10,000 for the first year and $25,000 for the second year. The first year could be devoted largely to establishing contact with the industry with a view to co-operative research. The nature of the problem is such that the most effective work can be done only with the hearty co-operation of mills interested, as much of the investigation would, of necessity, have to be done at these mills, supplemented, of course, by a fundamental study at the Forest Products Laboratory of the individual problems as they arise. By the second year the problem and the method of attack would be sufficiently well defined to warrant the larger expenditure.

### Shorter Pulp Cooking Method Advocated

The Forest Products Laboratory has patented and dedicated to the public the idea of impregnating wood pulp chips with the cooking liquor before the commencement of the cooking operation, in order to obtain stronger and more uniformly cooked pulps in shorter cooking periods.

Trials on a commercial scale in a southern sulphate pulp mill have been made, and it has been found that the process is entirely feasible.

In the mill trials the amount of steam used in cooking a digester charge yielding 3 tons of pulp was reduced from an average of 9,000 pounds to an average of 6,000 pounds. The density of the black liquor at the end of the cooking period was raised from 16° to 18½° Beaumé. Only one hour was required to bring the digester to an operating pressure of 90 pounds per square inch, while with the standard mill cooks 2 hours was the usual period for this operation. It was possible, therefore, to carry out the impregnation and bring the digester to pressure as quickly as the digester could be brought to pressure by the old process. The time at pressure could be reduced from 4½ to 3½ hours, thus actually decreasing the time of the cooking cycle.

The mill trials, which were made during 1918, were interrupted owing to the pressure of work under way at the Lab-

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***Eighteen reasons why you should use "Michigan" combination steel and wood pipe***

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

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***"Steel for Strength—Wood for Durability"***

oratory in co-operation with the War Department. Since that time there has been no opportunity to complete the demonstration either in the same or other mills.

To obtain the fullest benefit from the process, it is necessary to adapt it to the local conditions of each mill. This requires thorough chemical engineering supervision over a period long enough to solve local problems.

In 1920, 25 sulphate mills made 188,651 tons, and 31 soda mills 463,305 tons of pulp, representing a total value of $66,997,134. These mills were distributed over 21 states. One man's time could be profitably employed for a year or more in making contact with these mills, conducting demonstrations and assisting in placing the improvements on a firm scientific and economic basis. To finance a campaign for "selling" the idea to the mills will require at least $10,000. To fail to provide this fund means to waste a large proportion of the funds already spent on this development by the Laboratory.

A saving on fuel alone from the introduction of this modification of the process at the rate of 1,000 pounds of steam per ton of pulp, and coal at $6.00 per ton, would amount to $280,000 for the year. Besides this, there would be a saving of chemicals, a decrease in the cost of evaporating the black liquor, and an increase in the value of the product obtained. The $10,000 needed to carry these results to the industry represents less than 5 per cent of the possible saving to the industry and does not seem an unreasonable amount in order to save over a quarter of a million dollars.

### Decay of Wood Pulp Can Be Prevented

Forty-eight pulp mills in this country are reported to have a stock of over 2,200,000 cords of pulpwood in storage. Investigations by the Forest Products Laboratory have revealed the fact that losses from decay amounting to at least 10 per cent of the weight of the wood may be expected in these mills under the prevailing storage conditions. A 10 per cent loss, at a cost conservatively estimated at $15 per cord, would amount to a total of $3,300,000 due to shrinkage from decay at these mills. At least half of this loss could be prevented if proper methods of handling the wood were followed. Methods of keeping the wood yards sanitary have been suggested by the Laboratory, but convincing demonstrations are needed to bring the pulp and paper industry to realize its losses, and persistent education of mill operators is required to bring about the adoption of known preventative measures.

By far the greatest amount of pulp deterioration is found in stored groundwood. Groundwood pulp is generally stored, owing to large seasonal fluctuations in the hydraulic power used in its manufacture. Furthermore, it is usually stored in the form of wet or hydraulic-pressed laps, which are more subject to decay than the machine-dried chemical pulps.

Several antiseptics have been demonstrated by the Forest Products Laboratory as effective in preventing the spread of infection in pulps, if applied at the time of manufacture. The Laboratory should have men available to assist the pulp mills to install and operate the facilities for applying these antiseptics, and to help the mills develop safe storage conditions for their future stocks of pulpwood. An additional appropriation of $10,000 would finance these men in the field for a period of one year. It is only by such direct assistance that the value of the Laboratory's investigation can be fully translated into profit for the industry and for the public.

## G. M. Jones Named Chief of Paper Commodity Division

After several months of discussion, devoted chiefly to an effort to find exactly the right man to fill the position, the United States Bureau of Foreign and Domestic Commerce has established the Paper Commodity Division as one of the newly organized commodity groups, planned to assist in the development of special branches of American industry.

Grosvenor M. Jones has been named as chief of the division by Dr. Klein, director of the Bureau, and began his work January 25. In order to properly co-ordinate the work of this division with the needs of the paper industry, Secretary Hoover named a committee of paper manufacturers through the American Paper and Pulp Association, and asked them to meet with him at Washington, Monday, January 30, to discuss co-operation between the department and the industry. The committee was selected by the American Paper and Pulp Association, because this association had been representing the entire industry in the effort to have a paper division established in the bureau. The work of the division, however, will be organized to assist the entire paper industry in all of its branches, not alone for export trade development, but for general domestic business as well.

The selection of Mr. Jones will undoubtedly meet with approval throughout the industry, for he spent a year with the American Paper and Pulp Association in 1912-13 when he made an elaborate statistical study of the markets for paper in Latin America. His long association with various government departments, as well as his work with the paper industry, will make him peculiarly fitted to handle the work of the paper division.

## Re-Forestation Undertaken on Large Scale in Louisiana

By Duncan F. Young

WHEN the Great Southern Lumber Company began operations at Bogalusa, La., between fifteen and twenty years ago an extended article appeared in one of the New Orleans newspapers setting out the time, purposes and hopes of the promoters of this great big enterprise. One outstanding feature that attracted the attention of the conservationists of those days was the statement that the holdings of this company were such that by going from one section to another the supply of timber would never be exhausted. The intention was to cut down trees in excess of a certain size only, going gradually around the entire belt of timber, but when, after a few years' operations, people complained of the bare appearance of the cut-over lands of this company and others, the explanation was made that skidders so injured trees that to leave them in that condition would be to lose that much timber, so it was decided to "cut clean" as they went, and as a consequence a house builder traveling that way would have been compelled to bring his lumber with him, and many acres of land once worth $60 an acre was now absolutely valueless for any practical purpose other than reforestation.

The total area of the cut-over lands in the piney woods of the Coastal Plain of the South is now estimated at something over 100,000,000 acres. Much of this area is said to be unused and unproductive, and what to do with this questionable asset has been a vexed problem to the owners. An effort to raise live stock to build up the land for agricultural purposes and to take the place of the timber that had been taken away was undertaken, but where the work was not pursued on a scientific basis and the natural range was depended upon exclusively, failure almost invariably followed, and as a consequence the best-intentioned owners of these cut-over lands and others interested in the proper development of the country sought out additional means for bringing these unprofitable lands back into service and value.

Fires, razor-back hogs and cattle ticks have had as much to do with bringing about concerted action in the proper development of these cut-over lands as the boll weevil has had in the diversification of crops throughout the cotton belt. The washing of hillsides and the filling of streams and waterways with the silt and fertilizer that follow these erosions have caused piney woods land owners to think over the situation and take counsel with each other. Taking counsel has brought about co-operation and a unity of action that have resulted in the introduction of better stock and in raising feed for that stock, and in the process of raising that feed the better preparation of these cut-over lands for the making and producing of sustaining pastures, and, finally, in the prevention of erosion and the filling of waterways by the planting of trees on these hillsides as a means of protection. And now comes the Louisiana Forestry Association assisting the Great Southern Lumber Company in the precedent of not only protecting the hillsides from washing and the water courses from filling up but in making a valueless article valuable, a waste, a government taxable resource and tree-growing, a rich commodity, that is so much needed now and in the near future, by going into reforestation in deep earnest, so that the timber needs and paper demands may be supplied.

# Plamondon Transmission Machinery

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# Convention of the Canadian Pulp and Paper Association

**Held on January 25, 26 and 27, 1922, at the Ritz-Carlton Hotel, Montreal**

DURING the three-day period from Wednesday, January 25, to Friday, the 27th, the ninth annual convention of the Canadian Pulp and Paper Association and meetings of its various sections were held in Montreal. Following the usual custom, the Quebec Forest Protective Association, Ltd., held its annual conference during the same period. Annual meetings were also held by the St. Maurice Forestry Protective Association, the Southern St. Lawrence Forestry Protective Association and the Province of Quebec Limit Holders' Association.

A wide representation from the Canadian mills was present at these various meetings and many came from all parts of the States. So much exists in common between our United States and the Dominion of Canada that much good is derived from the fact that both countries are generally well represented at these pulp and paper conventions.

## TECHNICAL SECTION MEETING

The Technical Section of the association opened their meeting at 9:30 a. m. Wednesday in the ballroom of the Ritz-Carlton Hotel. Chairman George Carruthers presided, and after disposing of the minutes gave a short address of welcome to the members and visitors from the States.

Reports of the standing committees were read, and a letter from John Stadler, chairman of the Committee on Mechincal Standards, stated that nothing had been accomplished by the committee during the past year, owing to the lack of needed funds.

### Committee on Education Report

T. L. Crossley, chairman of the Committee on Education, submitted the following report:

To the Technical Section, Canadian Pulp & Paper Association:—

Your committee has to report on matters of some moment, and our report is in two parts:

First, as to production of text books—

The Chairman of the Joint Vocational Committee requests us to report that the state of the text books is:

(a) STATE OF COMPLETION. Volumes 1 and 2 have been on the market now for some months. Orders have been received in Canada for well over 100 sets. Volume 3 is so near completion that it may appear as a twin with this report, a biological oddity after much labor. Manuscript for every section of volume 4 has been submitted and drawings for this volume require only reference lettering. There is some manuscript yet to come in for volume 5.

(b) AS TO FINANCE. From the first of January, 1922, it was estimated that $1,000 would be required to complete volume 3. Nothing further was due on manuscript for volume 4 as far as could be seen, and about $1,000 for manuscript purposes on volume 5. It is estimated that revisions of submitted manuscript, indexing, further drafting and rental would require $6,000, and new manuscript, traveling, unpaid balances and incidentals $2,000, making it appear that $8,000 would cover to complete volume 5. With amounts now received and expected in the United States, we will have to look for a further grant from the Canadian Pulp and Paper Association of from $4,000 to $5,000. The United States have already raised $2,000 more than their allotment and expect to raise $3,000 more. The totals would then stand: United States, $25,000; Canada, $15,000.

Part 2, as to consumption—

Requests for organization of classes, or for plans in cases of classes already formed, have come to us from Federicton to the Soo. We must take decided action without delay.

Either the industry as such must provide the means or grant its ægis to some outside organization over whose operations the Canadian Pulp and Paper Association can exercise supervision.

Appended to this report and forming part of it is a letter received by your committee and to which it has given very critical attention. Failing a decision now on the part of the industry to create and maintain an adequate organization for the purpose of carrying on educational work, your committee is of the opinion that the proposition of the Industrial and Educational Publishing Company be accepted in principle.

Further, your committee suggests that if this recommendation is adopted by the section and endorsed by the Canadian Pulp and Paper Association, a representative committee of executives in the industry be appointed to decide on the details and supervise the operation of the consequent educational work.

Respectfully submitted, Committee on Education, (Sgd.) George Carruthers, A. P. Costigane, C. N. Gain, J. N. Stephenson, D. Daverin, T. L. Crossley, chairman.

**Appended Proposition:** "To the Committee on Education of the Technical Section of the Canadian Pulp and Paper Association: The Industrial and Educational Publishing Company, Gardenvale, Quebec, wish to lay before your committee the following proposals, as a means of obtaining definite results from the use of the series of text books now being prepared:

"1. The company will negotiate with heads of education departments of provinces and, together with these authorities, and always working in close coöperation with the mills of each province, to make such adjustments in curricula of existing classes as may be necessary for the introduction of text books prepared by the joint committee.

"2. The Industrial and Educational Publishing Company has inaugurated a department to undertake vocational education work in other leading industries and will be pleased to include direction of both class and correspondence instruction in the pulp and paper industry, and if the approval of your industry can be obtained at the coming annual meeting of the Pulp and Paper Association, arrangements will be completed to furnish instruction September 1, 1922.

"3. Written examinations will be held and the papers examined and marked by properly qualified examiners. Information as to progress of students will be supplied to the office of the Secretary of the Canadian Pulp and Paper Association.

"4. Growing out of all these classes in which the elementary books of the pulp and paper course will be studied, the company will find it necessary and will direct correspondence instruction which will be available for students at any time.

"5. It is, of course, understood that the cost of above services to the students of the pulp and paper industry would not exceed the current rate for such instruction charged by similar organizations.

"In order to take care of this work the Industrial and Educational Publishing Company has secured the services of two of the leading men in vocational education on the continent. One of these is Mr. John T. Hoyle, who for the last two years has been one of the chief instructors in the Carnegie Institute at Pittsburgh. Mr. Hoyle was formerly an editor of text books for the International Correspondence Schools. The second is Mr. T. L. Crossley, who has been in close touch with industrial education for many years and has written a number of articles bearing on this subject and who is well known as a pulp and paper technologist. The company shortly expects to engage a third man to collaborate with these and has, in addition to the three men referred to, a large staff of writers and one of the most up-to-date printing and publishing plants with its own postal facilities, including a special postoffice in the plant, and is therefore equipped in every way to undertake this work."

A general discussion followed the submitting of this report and a committee was appointed to consider the question of recommending to the parent body the appropriation of $5,000 to complete the text books. The first copy of volume 3 to come from the book bindery was presented to Chairman George Carruthers by J. N. Stephenson, who remarked that he should accept it as a reward for the intense interest he had taken in its production.

J. J. Harpell, president of the Industrial and Educational Publishing Company, Ltd., explained the manner in which his company intended to establish the vocational classes throughout the provinces, and stated that if their proposition was accepted they should have classes in shape by the first of September. The matter of considering this proposition and recommending it to the parent body was put into the hands

**and**
**Crocker, Burbank & Company**
**said:—**

ALVAH CROCKER, Pres. & Treas. CHAS. F. CROCKER, Vice-Pres. & Asst. Treas.

CROCKER, BURBANK & CO.
PAPER MANUFACTURERS.

SHIPPING POINT FITCHBURG, MASS. STATION

Fitchburgh, Mass. December 7th, 192[illegible]

Gentlemen:

In reply to your letter of December 6th, in reference to the instruments we have received from The Foxboro Co., Inc., we beg to state that the Recording Liquid Level Gauges are used for telling us the height of stock in our large stock chests. They work perfectly.

We also use the Heath $CO_2$ Recorders in our boiler rooms where we are using oil as a fuel. We could not get along without these or some similar instruments, and we feel that we can most highly recommend those you have furnished to us.

Yours very truly,
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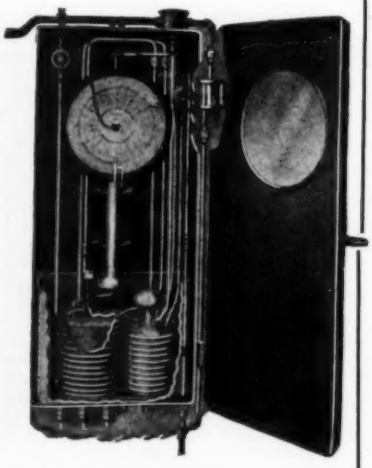

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of the above committee with instructions to report at a later session.

The committee later recommended that the proposal in principle be accepted. This was moved and adopted.

### Committee on Abstracts and Publications

J. N. Stephenson, chairman of the Committee on Abstracts and Publications, submitted the following report:

During the past year the committee has collected the material for a second volume of Proceedings and List of Members of the Technical Section; it brings the history of the section from 1918 to 1921 and presents a revised list of the members. This 72-page book is available to members on application to the secretary.

Abstracts of the literature have been carried on as heretofore, with coöperation of the Abstract Committee of the Technical Association of the Pulp and Paper Industry, of which Mr. Ross Campbell is chairman. The staff of abstractors has been increased and the scope of work somewhat extended. The number of pages of abstracts published during the year 1921 has been considerably greater than in any previous year and these abstracts have been reprinted in the form of a bulletin and distributed by the secretary to the members of the section. A number of copies have been retained in order to provide for bound volumes for those who may desire them.

The Pulp & Paper Magazine has continued to function as the official organ of the Technical Section and has printed full reports of papers and discussions at the annual meeting, a review of the summer meeting, and a translation from Italian article on Bronzes. This translation was provided by the Committee on Mechanical Standards. This article was reprinted for distribution, as was the case with several other articles that appeared in the magazine during the past year. Among these might be mentioned "The Structure of Cereal Straws," by Prof. Lloyd of McGill University, and three articles on "Use of Decayed Wood and the Prevention of Decay of Wood Pulp," by J. S. Bates, and an article on the "Use of Decayed Wood for the Manufacture of Soda Pulp," by E. Sutermeister.

At the time of the change of secretaries by the T. A. P. P. I. the two abstract committees made an arrangement with Mr. A. P. Coutre, who has been serving on the abstract staff for the Technical Section, to prepare all the abstracts made by both committees for distribution to the various trade journals subscribing to this service. The committees plan to proceed along the same lines with hopes of giving even better service in the coming year. Respectfully submitted, J. N. Stephenson, chairman.

The Financial Report, which showed a substantial balance, was read and adopted.

### Prizes Awarded for Essays

Chairman Carruthers announced the names of the winners of the prize contest conducted by the Technical Section. The following received the first three prizes and were awarded their checks and congratulated:

First Prize, $100.00, won by W. C. Munro for an essay on newsprint.

Second Prize, $50.00, won by D. E. Reid for an essay on the Sulphate Process.

Third Prize, $25.00, won by F. W. Bradshaw for an essay on the Sulphite Plant of Price Brothers & Co., Ltd., at Kenogami.

### Papers

A very interesting paper was read by R. J. Blair, Pathologist at the Forest Products Laboratory, McGill University, Montreal, on the subject of "The Use of Clean Water as a Preservative for Stored Mechanical Pulp." An exhibition of results gained from testing of groundwood pulp after it had been stored in clean water over a period of seventeen months was shown by graphic charts and samples of the pulp itself. E. Parke-Cameron, Associate Chemist at the Forest Products Laboratory, who assisted Mr. Blair in making the tests, assisted in the discussion which followed. This article is published on another page of this magazine.

A valuable paper was read by T. S. Remsen, St. Maurice Lumber Co., on "The Use of Fuel Oil." A table was exhibited which showed the results gained from the running conditions in two mills operating under like conditions of load and climate. Based on coal at $10.50 per ton in hopper over boilers and oil at $2.30 per barrel delivered in storage plants, there was a saving of 22 cents of steam per 1,000 lbs. delivered from the boiler house. Mr. Remsen's paper is published elsewhere in this issue.

Probably no subject is of more growing interest than the use of powdered coal for generating power. Mr. Henry Kreisinger, of the Combustion Engineering Corporation, New York, gave a most enlightening address on "Burning Pulverized Coal Under Power Plant Boilers." The paper was prepared in collaboration with Mr. John Blizzard of the United States Bureau of Mines. Mr. Kreisinger showed by the use of charts that in many steam plants, steam can be made more cheaply with powdered coal than when burning coal by any other method. "It may be pointed out," said Mr. Kreisinger, "that the higher the price paid for coal and the lower the costs of electricity, the greater are the advantages to be derived from pulverizing coal before burning it. Pulp and paper manufacturers, situated as they commonly are, far from the coal mines and near to the water power, may therefore hope to derive more benefit from burning powdered coal than they who generate steam with cheaper coal, but whose electric power for preparing the coal costs considerably more." Mr. Kreisinger's paper will be published in a later issue.

"Money from Steam" was another paper on power delivered by R. L. Weldon, M. S., Three Rivers Pulp and Paper Co. Mr. Weldon said that it is the dollars and cents cost per ton of steam that is the fundamental consideration, and that though the last year saw a distinctly downward trend in the price of fuel, it also saw quite as distinct a trend in the price of paper, and that the percentage relationship of the cost of steam to the selling price of paper is probably higher today than it was during the period of peak prices for coal. Mr. Weldon's paper will be published in a later issue.

So much has been said about the possible use of Jack pine in the manufacture of newsprint, and even progress has been made to the extent of successfully doing so, that great interest was manifested in the results obtained by the Belgian Industrial Co., Ltd., of Shawinigan Falls, Quebec, and exhibited by Mr. Maurice Neilson of that company, in his paper, "The Utilization of Jack Pine in the Manufacture of News Print." A lengthy discussion took place following Mr. Neilson's address. His paper is published elsewhere in this issue.

Mr. C. R. Hazen, of Milton Hersey Co., Ltd., Montreal, read a very helpful paper on "Safeguarding Shipments of Pulp to Foreign Ports."

### Where Do We Stand?

One of the prime features of the Technical program was a discussion outlined on the topic, "Where Do We Stand?" The argument was "Are the problems of our industry developing so rapidly that the technical men are unable to keep pace with them, or are the technical men in advance of the industry?"

The discussion was opened by Mr. R. A. McInnis, manager of the Abitibi Power and Paper Co., Ltd., who presented his argument from the position of the "inside looking out." He said that the technical man is not keeping pace with the industry, and as a proof made the statement that all the educational literature being published in the current press shows a wide range of thought and not sufficiently concentrated. Further, he said that the technical man has not yet become firmly established in the industry, but is still in his infancy as compared to what might be expected of him in relation to his industry.

One of the reasons for the latter, Mr. McInnis said, was that the technical man has wandered around the industry without having any real governing control; he is at a lack to know what is really required. Comparison was made with the mining industry, which is managed and operated by technical men. The paper industry is handicapped for lack of equipment and facilities.

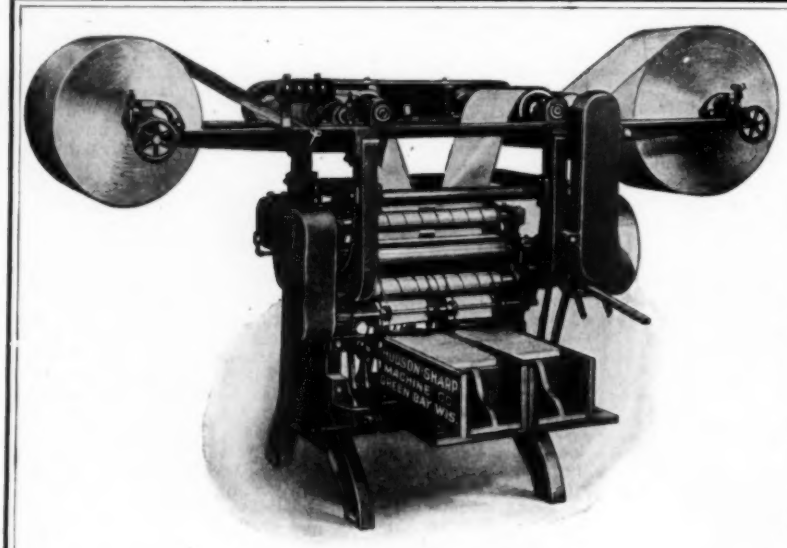
"The management," said Mr. McInnis, "wants quality, economy and production." One of the first things which is asked is how to control the present irregularity of production. The laws involved in production irregularity are to be learned only by research and work on the part of the chemist and engineer. He said that the paper industry wants information along specific lines, and this could be gotten no better than through the means of some private organization such as a central laboratory, about which so much has been said.

The Woodlands Section is making great progress towards the conservation and yield of the forest. The forester wants the mill to use those woods which are now more plentiful but which the industry has not yet been able to use, and unless the management can comply, the mills must necessarily lag behind. This is an example of where the forester on one hand and the technical man on the other must co-ordinate.

Humorous reference was made to the general rule that a young technical man fresh from college believes he can go to a mill and shortly become an expert. This, of course, is a mistake, as it is necessary that he should come to his conclusions only after long experience and the watching for results just as the practical men obtain their knowledge.

In concluding his argument, Mr. McInnis expressed the hope that the industry will recognize the importance of the technical men. He said that if every mill had a staff of technical men, and there were central research bureaus, etc., many of the present troubles would be solved, but with one or two companies alone having such a staff, the results would not come; it is necessary that all should work together.

Dr. J. S. Bates, Ch. Engr., Price Brothers and Co., Ltd.,



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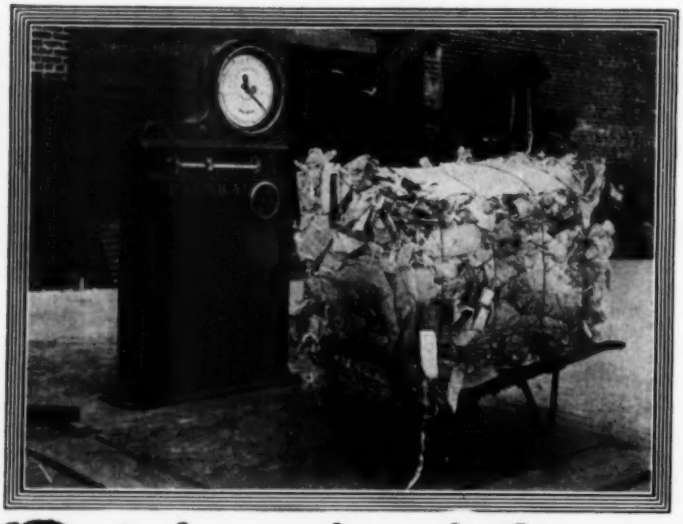

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followed Mr. McInnis. He discussed the topic from the viewpoint of the technical man. He said that Canada is making good progress in the development of science; that the past generation sent their students to Germany to get their knowledge; many at present are sending them to the United States, but in the future, it would not be necessary to leave Canada. The same holds true in the relation of science to industry. Canada has not yet reached the full application of science to industry, but as the States has been remarkably progressive in this respect in the last ten years, it is also possible for Canada to do the same.

Speaking from the Canadian viewpoint, Dr. Bates said that the paper industry is not as well organized as others, such for example as the mining and electrical industries. As the result of a large export business and its inherent waterpower advantages, the paper industry in Canada has become enormously large in just the last few years, and it can hardly be expected that perfection could be reached in so short a time.

The annual lists of the Technical Section show a rapid increase in technical employment; the manager's attitude towards the technical man is becoming better. There has hardly yet been time to expect real results in scientific research, but it also is true that there has been no stock taking to find out just what has been accomplished.

Dr. Bates said his idea is that some organization is needed to carry on experimental and research work. The custom has been in the past to make the best use of the facilities which were present. The real aim in view is to begin fundamental research, and thought should be applied to accomplish this aim.

Canadian paper mills are not in competition, said Dr. Bates, they are a national unit in competition with other countries, and should therefore co-operate with each other.

W. B. Campbell, Ch. Engr., Provincial Paper Mills, Ltd., in discussing the subject said that problems are developing so rapidly that the technical man can not keep up with them; for every problem solved there are two more opened up.

Mr. Campbell explained how the practical mill man has had no technical training, but received his education and knowledge of papermaking from long experience and working to the top from the bottom. He explained the ability of this type of mechanic to sense trouble before finding it, and how he has learned the most convenient way to check it; the convenient way is sometimes the most economical.

There is a general lack of knowledge, however, regarding the places where wastes really exist. The man who has had a technical training is best able to discover these wastes, and there should be a means of bringing the practical ability of the experienced mill man in contact with the one who is technically trained and allow them to reason it out and correct it. One disadvantage in this situation has been that until recently the mill man and the one having technical training have not been able to talk in the same language; their terms have been different. In this respect, Mr. Campbell said that the educational course provided through the help of the text books would be of immeasurable benefit to the untrained man; he laid stress on the advantages to be gained from mastering even the first two volumes of these text books.

Mr. Campbell supported the plea for the need of a central laboratory, and spoke of the invigorating effect it would make through the mills. He said that it would make the mill man think.

That the technical man should sell the management through publishing more detail data in the technical journals, is the belief of Mr. R. W. Hovey, Chemist, Abitibi Power and Paper Co. He agrees with the central laboratory idea and said that fundamental research is very necessary.

Mr. Hovey said that the technical man is already beginning to crystallize what is required by the industry, but emphasized the need of a technical manager in the mill organization. He said that education is essential, but that the idea of education must be sold to the mill.

Mr. L. H. Shipman, Ch. Engr., Spanish River Pulp and Paper Mills, Ltd., said the fact that during the recent dullness, mill after mill discharged the technical men and retained the superintendent and department heads indicated the superior value which is placed on the practical mill men, and that the technical men have not yet demonstrated their value to the mill. One of the reasons for this is, as has been stated, that the technical and mill men have not yet been brought together. Mr. Shipman said when there is trouble and wastes are discovered, it is not a question of who is to blame so much as it is for the two departments to get together and correct the evil. The management should bring them together but as yet has been unable to take time to do so. Mr. Shipman emphasized the need of common horse sense in regard to mill troubles and wastes and said that the technical men can do a whole lot of listening to the operating department. This concluded the argument.

### Election of Officers

The following were elected officers and members of the Council for the ensuing year: O. F. Bryant, Laurentide Co., Ltd., Grand Mere, Quebec, Chairman; R. W. Hovey, Abitibi Power and Paper Co., Iroquois Falls, Ontario, Vice-Chairman; George Carruthers, C. Nelson Gain and Maurice Neilson, members of the Council.

### The Smoker

The annual informal "Smoker" was held on Wednesday night in the Grill Room of the Ritz-Carlton Hotel. The usual round of fun and merriment prevailed under the able leadership of the inimitable Jimmy Rice, who certainly has no peer in the recitation of French dialect stories. A number of boxing bouts were put on by the Montreal Amateur Athletic Association, finishing with a whirlwind relay in which three boxers participated and finally capped the climax by licking the umpire. A number of entertaining song selections were also enjoyed.

## CANADIAN PULP AND PAPER ASSSOCIATION MEETING

The annual meeting of the Canadian Pulp and Paper Association opened at 10 A. M. on Friday, in the Vice Regal Suite of the Ritz-Carlton Hotel.

President Percy B. Wilson presided and delivered the following address:

### President's Address

Gentlemen: In accordance with established custom it is the duty of the president, in calling our association to order for this its ninth annual meeting, to direct your attention, briefly, to the outstanding features affecting our industry which have marked the year just closed.

From an operating and financial point of view the year has not been without its trials and its difficulties. In common with other industries we have had to pass through a period of readjustment which has challenged our utmost energies and keenest wisdom. A falling market and a decreasing demand for our products almost at the outset of the year found us with high-priced inventories, excessive labor costs, abnormal transportation charges and burdensome taxation to contend with. Liquidation of such of these items as it has been without our power to bring about has necessarily been slow and is still incomplete. As to the others, we have been powerless to secure the readjustment which the circumstances call for and which must follow before the industry is once more upon a firm foundation.

It is, perhaps, needless here to attempt to go into the various causes responsible for these changed conditions. They are referred to in detail in the reports of the chairman of the respective sections. Principally, they result from the universal depression in trade, aggravated, so far as our industry is concerned, by the undue advantages enjoyed by our competitors in Germany and other European countries on account of the depressed value of their currencies. It is pertinent here to mention, however, that a very considerable contributing cause of our present difficulties results from the attitude taken by the different price-fixing authorities in Canada and the United States which, from 1917 to 1920, undertook, under governmental authority, to regulate the conditions under which we were permitted to carry on our business. The fact demonstrates once more the fallacy of arbitrary interference with the recognized and established laws of trade.

In regard to the future, our industry may be said at least to be no worse off than any other. We are engaged in producing a staple commodity upon which business and industry generally are largely dependent. The outlook is distinctly better than for the period from which we are now emerging. As an association, as well as an industry, we can look forward with confidence if not with optimism.

Referring more particularly to the progress made during the past year and to the present status of our Association, it is gratifying to be able to record, in the first instance, that the association has been of much assistance in helping the members through the difficult and hazardous times we have all experienced. Its membership continues loyal. Its activities have been as many and as beneficial as in other years.

Special mention should be accorded to the Technical Section, whose usefulness to the industry and the association is constantly growing. The members would be well advised to give the report of the chairman of this section careful consideration. As he points out, it is in times such as those through which we are passing that the technical branch of our industry must undergo the acid test and prove its worth. If, by increasing the efficiency of the mill and evoking economies in manufacturing methods without sacrificing quality, it can reduce the cost of production it will have done something toward counteracting the effects of a falling market and to

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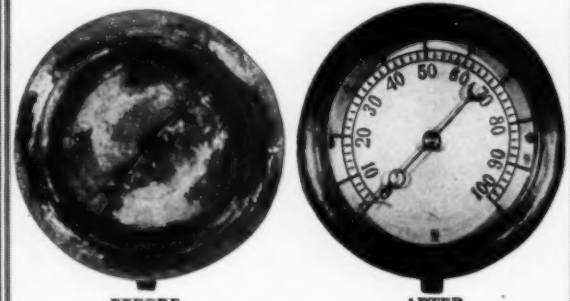

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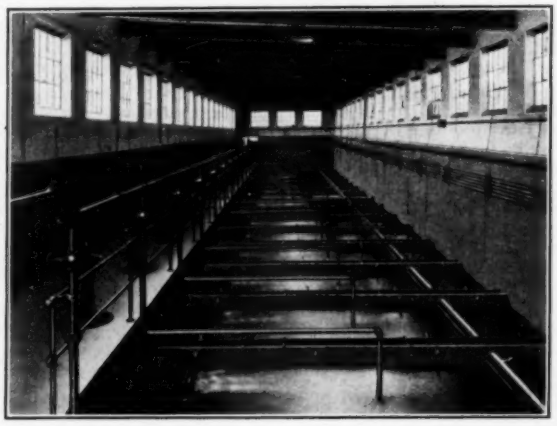

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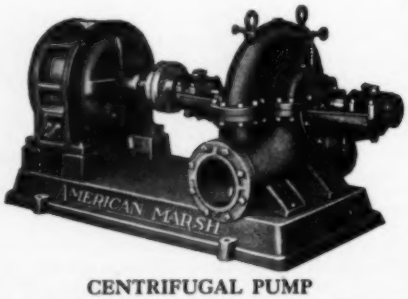


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justify its existence. Attention is also directed to the suggestion for an improved apprenticeship system and action to give it due effect is recommended.

The Vocational Education Committee, which is operating in conjunction with the Technical Section, has continued its work throughout the year and will come before you with a report of its accomplishments and a request for further funds to enable it to carry on its task. This is a work which we cannot allow to lag and one whose value will become more apparent as time goes on.

The growth and development of the technical branch of the association is such as to warrant us in looking forward to the time when it will necessitate a secretary of its own to devote his attention exclusively to its affairs. This is a subject which should come under the consideration of the Executive Council at an early date.

The Woodlands Section is also to be congratulated upon its work during the year. The principal function of this section, that of studying ways and means for conserving and replenishing our pulp wood resources, is one of the most important before the association or, for that matter, before the Dominion. Any effort put forth in that direction merits our warmest support and commendation.

The progress of the Committee on Scientific and Technical Research has been held up by the failure of Parliament to pass the act providing for the establishment of a national institute of research in which the association is so greatly interested. The act containing the necessary provision was, it will be recalled, passed by the House, but failed of passage by the Senate. It is probable that it will be reintroduced at the coming session with, it is hoped, more favorable results. It should be the duty of the association to do everything possible to bring about the final passage of the measure.

Among the matters that have engaged the attention of the executive during the year was that of the Australian tariff on paper. The new Australian tariff law, which became effective last year, imposes an import duty amounting to £3 per ton upon news print and of 15 per cent. ad valorem on other grades of paper, but admits news print from the United Kingdom duty free and other grades of paper on payment of a duty of 5 per cent. ad valorem. The effect of this discrimination against Canada, which is placed on the same footing as Germany and other countries outside the empire, will, unless alleviated, be to exclude Canadian paper from the Australian market. Numerous representations on the subject have been made by our executive to the Canadian Government and there is reason to believe that action looking to an amelioration of the situation may shortly be forthcoming.

A notable event of the year was the visit of our representative to Sweden, Norway, Finland and other European countries in quest of information on forestry methods and administration. It is gratifying to be able to report that he was most cordially received in all the countries visited and was given every facility for conducting his investigations. The knowledge he acquired has been passed on to the members and to the public in general, and will, it is believed, prove effective in helping our authorities to shape a rational forest policy for Canada and in spurring our own people into greater activity on behalf of forest conservation and reforestation.

In this connection, it is a pleasure to state that we have enjoyed fraternal visits from a number of eminent leaders of the Scandinavian pulp and paper industry, bent upon reciprocal missions, during the year. We particularly mention those of Thorsten Lungren, managing director of the Swedish Cellulose Association, and of John Poulson, managing director of the Norwegian Cellulose Manufacturers' Association, whose visits permitted a direct exchange of information and ideas, helpful, it is believed, to the interests of all concerned.

Our publicity department has continued its satisfactory work and has overlooked no opportunity to present to the public the best interests of our industry. Two special advertising campaigns have been undertaken on behalf of the Book and Writing Section which cannot help but bear good fruit. An exhaustive investigation has been made into the question of whether or not the increased use of newsprint can be promoted by the use of advertising, and a plan has been evolved having that end in view. Its adoption is still under advisement.

The traffic bureau has been transferred from Toronto, where it was operated in conjunction with the Canadian Manufacturers' Association Headquarters, to our own offices in Montreal. Some question has arisen as to the advisability of continuing this feature of the association's work. A plebiscite of the members has been taken and awaits the action of the incoming executive. The Traffic Bureau's annual report is included among those distributed at this meeting and should have the careful study of all the members.

In connection with the traffic question it may be well to point out that the present high freight rates on pulp and other paper-making materials are such as to prove a serious detriment to our industry. In comparison with the transatlantic ocean rates enjoyed by our European competitors we are at a great disadvantage. A reasonable reduction in freight carrying charges would, we believe, start business moving and assist in solving the unemployment problem. It would create a market for wood products which cannot now readily be sold. This would bring work and wages, and the wages would buy many other commodities required by the workers. Canada is in a peculiar position of having so many raw materials from which to make money, and yet these raw materials suffer from high freight rates much more than do the average refined or manufactured materials on which the freight charges are so small that, in many instances, they affect the price little or not at all. The question of railroad wages is, of course, to be taken into account, but if we could get the traffic through lower rates we would be on the way to better times.

The association was most unfortunate during the year in losing the services of A. L. Dawe, who, as secretary for a period of nearly five years, did so much toward bringing the association to its present high state of efficiency and development. We owe a great deal to Mr. Dawe's capabilities, his enthusiasm for the association and its work, his untiring patience and extreme affability in all his dealings with the members, as well as his never tailing willingness to sacrifice himself whenever necessary to meet the requirements of a sometimes, at least, onerous and difficult position. We find some compensation for his departure in the fact that he is still connected with the industry, and because of that fact available for advice and assistance. I know that I but voice the view of every member in wishing Mr. Dawe the utmost success in his new undertaking, in recording our regret at his leaving us and our sincere thanks for his good work on behalf of the association.

As a successor to Mr. Dawe the executive has chosen Edward Beck, who has been Mr. Dawe's associate in the work for the past four years and who, as manager of the Publicity Department, is generally and favorably known to the members at large. The appointment is one upon which the association is to be congratulated when it is recalled that Mr. Beck was connected with the association throughout the whole of the difficult period when it was under government control and thus acquired a knowledge of its affairs that it would be difficult to impart to one who had not been "through the fire." His experience should prove of the utmost value to the association and its members in the future.

In conclusion, I desire to express my gratitude to the members and particularly to the Executive Council and the staff for their unswerving loyalty and support during the year. In times like the present, when everyone's energies are more or less concentrated on his individual problems, there may be a temptation to minimize or overlook the advantages of association in trade organizations such as our own. This, in my opinion, would be a great mistake. In times of stress, if ever, mutual confidence and mutual co-operation are essential. Instead of drawing away from our association or ignoring its calls upon us we should rally to its support and make it serve the purposes for which no other agency is so well adapted and no other can so readily accomplish. In the United States, trade associations similar to ours are now engaged in fighting for their right to exist, owing to a recent interpretation placed by the Supreme Court of that country upon a law originally designated merely to restrain interference with legitimate competition. As one of our trade associates on the other side of the border has pointed out in defense of the organizations thus assailed, "a properly and a legally operated trade association is pretty nearly fundamental to satisfactory development in our industries. There is every reason why manufacturers should get together to discuss common problems and there is no reason why they can't do it in a legal way. There are, too, no reasons why manufacturers should fail to work together wherever they can do it legally and for the general advancement of their industry." It is true that the Federal Trade Commission has practically absolved our sister association across the line from the ban in question and that, happily, in Canada, our right to organize and carry on for our mutual good on proper lines is not likely to be open to question, but if it were under attack here as it now is in the States the chances are that we should be much more concerned in rallying to its defense and much less indifferent to its continuance. As it is, we should be willing to give our associations all the support necessary to their efficient maintenance and growth.

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WIRE SIGNS

Cheney Bigelow Wire Works

Established 1842 SPRINGFIELD, MASS.

In closing I wish to bespeak your hearty support for and willing co-operation with the incoming administration and to express the fervent hope that the ensuing year will be the best and most successful in the history of the association.

### Reports of Committees

The reports of the various sections were submitted and adopted. Mr. George Carruthers made a special report concerning the text books and the need for an additional $5,000.00 to complete the work. The amount was granted unanimously and thanks were expressed for the faithful work done by the Joint Committee.

The report of the Special Committee on Education from the Technical Section to the parent Association was read as follows:

"This Committee has considered the proposal of the Industrial and Educational Publishing Co. to take over the development of education in the industry as per their letter attached to the report of the Educational Committee. It was decided that the Technical Section should recommend the acceptance of this proposal in principle by the Canadian Pulp and Paper Association, and that an Advisory Committee of the executives in the industry be appointed by the Association at this time to arrange the details and supervise both the plan and the operation. It is also recommended that authority be given the Educational Committee to arrange for the translation into French of the elementary sections of the text books."

It was moved and adopted that the plan be accepted in principle and that the Association co-operate with the Industrial and Educational Publishing Co. in developing suitable machinery for carrying on instructional work.

A special recommendation was made by Mr. Carruthers to consider the appointment of a committee to establish a system of apprenticeship in paper-making in the mills. The matter was favorably discussed and the appointment of the committee was left in the hands of the Technical Section.

### Ellwood Wilson Speaks for Woodlands Section

Mr. Ellwood Wilson, of Laurentide Co., Ltd., spoke for the Woodlands Section in part as follows:

"Mr. Chairman and Gentlemen, in the absence of the Chairman of the Woodlands Section, I have been asked to say a few words to you in regard to the action taken by that section yesterday. You are all aware of the great advantage which has come to the Association in general through improved methods in the mill.

"Methods are now refined to such a degree that they have had a great deal to do with reducing the costs of manufacture and everybody knows the value of your technical men in the mill. In the woods division, things are still in a rather chaotic condition and methods have not improved very much in the last twenty or thirty years. The Woodlands Section is trying very hard to do for the industry in general in the woods end of the work what has been done for it in the mills, and it is in view of that desire for improvement that I would like to ask the Executive Committee to approve of a plan to hire a trained mechanical engineer to be secretary of the Association and at the same time to contrive and help the members to introduce new and better methods into their woods operations. It was felt that the idea of an experimental station for this purpose was too expensive, especially at the present time, and it was believed that by having such a man, who would not only be a technical but a practical man, who would visit different parts of the country where various experiments would be carried out and who would spread the information thus gained amongst the different members of the Association, great benefit would result to the industry.

"The idea of a rangers' school was also brought up. We felt that the question of a rangers' school involved too much expense to be gone into now, but we believed that if we could get the right sort of man, he could form a small rangers' school without adding anything to the expense of the work."

Mr. Wilson presented another matter concerning the appointment of advisory committees in the provinces of Ontario and Quebec, made up of representatives from the lumbering industry and the pulp and paper industry. The purpose of these committees would be to confer with the Premiers and Ministers of Mines and Forests to talk over with them more or less questions of policy.

Legislation is being prepared in regard to the handling of woodlands which will have a very vital, and perhaps unfavorable effect on the industry. It is therefore necessary that active interest be taken in the matter by co-operating with the Government in everything that has reference to forestry legislation.

Mr. Wilson urged the necessity of having men on the Committee who had some authority and standing in the industry and would carry weight with the Government.

Both of the above matters were referred to the new executive with power to act.

### Election of Officers

George M. McKee, general manager of the Donnacona Paper Company, Ltd., Donnacona, Quebec, was elected President for the ensuing year, and H. F. E. Kent, president and managing director of the Kinleith Paper Mills, Ltd., St. Catharines, Ontario, Vice-President.

A motion was adopted to change the By-Laws to make the retiring president become automatically a member of the Executive Committee.

### Watch Presented to Mr. Dawe

Mr. A. L. Dawe, who recently resigned from the Canadian Pulp and Paper Association to become associated with the Canadian Export Paper Co., Ltd., was presented a beautiful watch by the members of the Association. Mr. Howard C. Smith, president of the Howard Smith Paper Mills, Ltd., made the presentation and very eloquently told of the service which Mr. Dawe had rendered the Association during the five years he was connected with it. Mr. Smith expressed his pride in having suggested Mr. Dawe for the office of secretary, and concluded by saying that though leaving its official ranks, he is still a part of the Association.

### Luncheon

As the members of the Association were seated comfortably at the annual luncheon in the Ball Room of the Ritz-Carlton Hotel, and Percy B. Wilson, the retiring president was on his feet and in the middle of a sentence, a piercing shriek tore the air, followed by the most horrible and inhuman howling which sent an icy thrill up the spines of the members and froze the blood in their veins. And as they turned to behold, they looked into the war paint and feathers of Iroquois Chief Two Axe and his tribe, who came running up to the head table and gathered with frenzied glee around the new president, George M. McKee, of the Donnacona Paper Company, the "Great Pale Face" of that region whom, with the interpretative help of H. G. Munro, also an Iroquois Chief, they invested as a Mohawk leader, to be henceforth known as Chief Donnacona.

After the new chief had been put through his paces the Hon. Honore Mercier, of the Department of Crown Lands and Forests of Quebec Province, gave an address which was very encouraging to those present as he held out great promise for the industry in this province and guaranteed the most stringent measures against waste of timber limits by fire.

Robson Black, manager of the Canadian Forestry Association, referred to Mr. Beck's recent visit of inspection to Sweden and the good results expected from it. "In recent years," he said, "your fire rangers, your inspectors, your forest protective associations, the responsible officers for the Government protective bodies have come to the conclusion that while mechanical equipment and ranger patrol are absolutely essential, and that a strong dose of police authority here and there exerts beneficial effects, the permanent solution of the forestry fire problem must come from intensive educational propaganda. Nine out of every ten fires start from human agency."

### The Annual Dinner

In the evening the annual banquet was held in Ritz-Carlton Ball Room. There was a large attendance and a considerable degree of enthusiasm was evident throughout the function.

Following the loyal toast and the singing of the national anthems of Great Britain and the United States, the chairman introduced Hon. James A. Robb, M. P., Minister of Trade and Commerce, who responded to the toast "Our Country."

The Minister spoke of the industry as being one of the oldest in the world, but found that its greatest progress in the country had been made since 1910. In that year wood pulp had been produced to the amount of $5,204,597, while in 1921 the value of the production had increased to $71,552,037. The paper products in 1910 amounted to $3,156,096 and in 1921 had increased to $92,103,307.

"I am not going to discuss the policies of ten years ago, but much of the prosperity of the industry was due to that much-discussed, much-abused and little-understood Reciprocity Bill of 1911. If the opening of the markets to the south of us was beneficial for the Canadian pulp and paper industry, would it not have been equally beneficial if opened to the growers of the hard wheat of the prairies, the best hard wheat in the world?"

Most of the products of the pulp and paper mills had been shipped to the United States. It was a fair trade. "We did not," continued the Minister, "exact hard cash, but were better customers of the United States than they were of ours. I submit to my fellow-guests from the United States that if they put up a tariff you cannot destroy our trade; you will

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merely disturb it. If we cannot do business with you, we will do business elsewhere. We are favorably located. We have great resources and great water powers, developed and undeveloped. It is the policy of the present Government to welcome capital. But we have not only water power, we have the railways, we have the ships, and not only that but we have intelligent labor willing to give a fair day's work for a fair day's pay."

In conclusion, Mr. Robb referred to the friendly relations between the two countries with a boundary line "protected only by the good-will of the people."

"Our Times" was the subject of a toast to which Major the Rev. A. P. Shatford, rector of the Church of St. James the Apostle, spoke. All were very much interested in the times, but there was no one present who would say that he was satisfied with them. Canon Shatford discussed the characteristic notes of the times and suggested the remedies. He declared that no industry today could be separated from ethical principles, and asserted that religion and ethics should permeate every state. Confidence and faith were necessary.

"A characteristic of the time was fear. Nations were suspicious and if we could banish fear from the hearts of men it would not be long before we could drive away suspicion and restore serenity. More than anything else was wanted a confidence in the future of the Anglo-Saxon people. We needed men of sane balance. The most dangerous men today are the sectarians and the partizans. We wanted thrift. We must save in order to restore the things destroyed during the war. Finally, we needed fellowship."

"Our Guests" was responded to by Dr. Hugh P. Baker, secretary of the American Pulp and Paper Association. He spoke in praise of the friendliness of the previous secretary of the Canadian association, Mr. Dawe, and of the good work done by the present secretary, Mr. Edward Beck, saying that we appreciated Mr. Beck's illuminating articles resulting from his trip to Europe. He spoke of the points of contract between the two peoples, due largely to a common ancestry.

The toast of "The Press" was responded to by Mr. B. K. Sandwell, who suggested some ideas for the merchandizing of the paper makers' product, and reminded his hearers that the press was the best customer of the industry in Canada.

The dinner terminated when the new president, Mr. George M. McKee, had been formally presented to the guests.

### WOODLANDS SECTION MEETING

The annual meeting of the Woodlands Section of the Canadian Pulp and Paper Association was held on Thursday, January 26, at the Windsor Hotel. An interesting program was prepared and carried out completely. The following two papers were read:

"Observations on Practical Forestry in Europe," by G. C. Piche, Chief Forester, Province of Quebec.

"Is Canada Making Progress in Forestry and Logging Methods?" by Messrs. W. G. Power and D. McLachlin.

The following officers were elected:

Chairman, T. P. Kernan, Donnacona Paper Co.; Vice-Chairman, B. F. Avery, Spanish River Pulp and Paper Mills, Ltd.; Councillors, S. L. de Carteret, Brown Corporation, Ellwood Wilson, Laurentide Company, Ltd., and T. F. Kenny, James McLaren Company, Ltd.

### NEWS PRINT SERVICE BUREAU MEETING

At the regular meeting of the News Print Service Bureau, held at the Ritz-Carlton Hotel on Friday, January 27th, the following officers were elected:

President, C. A. Babcock, Wisconsin River Paper and Pulp Co.; Vice-President, Louis Bloch, Crown Willamette Paper Co.; Secretary-Treasurer, R. S. Kellogg; Executive Committee, P. B. Wilson, Spanish River Pulp and Paper Mills, Ltd., W. E. Haskell, International Paper Co., and J. L. Apedaile, Price Brothers and Co., Ltd.

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### New Catalog on Fuses

A new catalog has just been issued by the Chicago Fuse Manufacturing Company, of Chicago, on electrical protecting materials and conduit fittings. This catalog contains 96 pages with 445 illustrations. It is a veritable encyclopedia that should be in the hands of everyone interested in such electrical devices.

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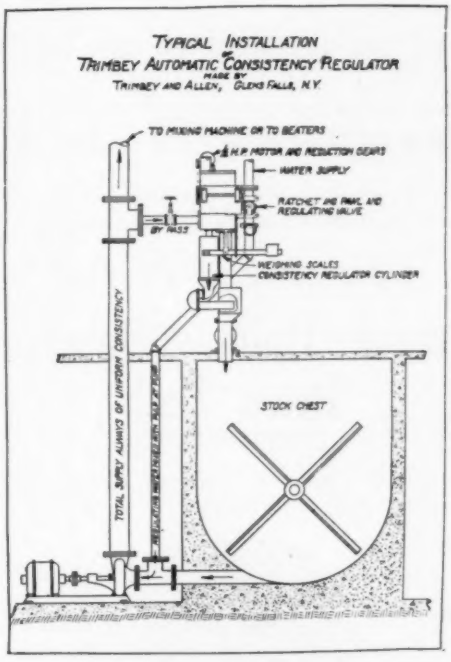
Dr. Lester A. Pratt, who has been in charge of the Research Laboratory of the Merrimac Chemical Company for the past six years, has been made Director of Research for the same company.


# Why Guess at Consistencies?




Install a Trimbey Automatic Consistency Regulator and know them. Know that it is always the same.

It will hold stock at a maximum variation of less than 0.2% consistency as pumped to mixers or beaters.

It removes the main cause of uneven weights.

The Paper Mill Superintendent of Laurentide Company, Ltd., writes:

> *"There is no question but what the control of the consistency of the Groundwood and Sulphite is responsible in a large measure for our successful running at high speed."*

—and the Trimbey is doing it.

**Our Line Includes:**

**Trimbey Automatic Consistency Regulators.**

**Allen & Trimbey Automatic Continuous Mixing and Proportioning Machine.**

**Trimbey Thickener for Chemical Pulp.**

**Wells Improved Rotary Sulphur Burner.**

**Allen Constant Level Stuff Boxes.**

**Trimbey & Tibbitts Soft Stock Motor.**

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A LARGE STOCK OF HIGH-GRADE BOILERS OF PRACTICALLY ALL SIZES, TYPES AND MAKES, TAKEN OVER FROM DU PONT CHEMICAL COMPANY'S AND OTHER PLANTS WITH PRODUCTION RECORDS — RECONDITIONED, OFFERED SUBJECT TO ANY INSPECTION, AVAILABLE NOW!

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BALL CHECK VALVES
VALVE FACING TOOLS

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Every ball bears our registered trade-mark



*Books on Paper Manufacture*

Subscriptions are being taken for the new Textbooks on the Manufacture of Pulp and Paper of the Joint Committee on Vocational Education of the Pulp and Paper Industry, a complete set of which should be owned by every firm or individual connected with the industry.

The set will be complete in five volumes. Volumes I and II deal with arithmetical operations, elementary mathematics, drawings, etc. Volumes III, IV and V, to be issued shortly, will deal with pulpwoods and their preparation; manufacture of pulp; analytical methods; and paper manufacture in all its aspects.

Volumes I and II are now on sale at $5.00 a volume. In the selection of classroom problems bearing on the principles and practice of pulp and paper manufacture they represent the highest standard in textbook publishing.

Orders, with remittances, will be filled by the Technical Association of the Pulp and Paper Industry, 18 East Forty-first Street, New York.



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*The Pipe of Service*

DURABLE—ECONOMICAL—EASY TO INSTALL

PRESSURE PIPE THAT NEVER BURSTS.
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The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

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## New England

Boston, Feb. 1, 1922.

Manufacturing conditions have improved during the month of January, although actual output has not materially exceeded that for December. Newsprint mills maintained their steady production, but board concerns, as well as the fine paper mills have found orders insufficient to justify capacity production. Tissue and wrapping paper mills have found the new year more productive of results although many tissue makers have merely resumed operations after a prolonged session of idleness. While demand for kraft paper falls somewhat below December levels, all the big wrapping mills of New England are moving out paper at top speed.

It is significant that while many paper merchants reported to their customers that a reduction in the 7½c mill price of kraft paper might be looked for, the only change has been an upward revision of ½c per pound in the quotation of the Nashua River Paper Company, who are now quoting 7½c f.o.b. mill identical to the quotation of Brown & Company and the Claremont Paper Company.

Among the merchants in the fine paper field, a controversy is waging regarding what is known as the "Long" price list, but it has made no noticeable effect on the demand for fine papers, favorably or otherwise. In Holyoke, mill activity is so far below normal that salesmen for supply houses reported it impossible to sell the mill purchasing agents unless concessions in price were agreed upon. An instance reported by one paper stock dealer proving the surplus of supplies, of five cars of short cuttings on a siding although the mill was operating five days a week and by no means all of its machines, is illuminating as a sidelight on writing mill conditions.

The difficulty seems to be that merchants cannot induce their customers to purchase paper for storage. These customers have the idea rather firmly ingrained that fine paper prices are still somewhat inflated and are acting accordingly.

### The Mill Supply Market

As it takes a pound of coal to make a pound of paper we will hardly be remiss in our duty in calling New England paper mill purchasing agents' attention to the very favorable market on New River and Pocahontas coal. To paper mills of New England located within fifty miles of the coast or of the important delivery ports, such as Boston and Portland, southern coal is the logical fuel to buy. It can be purchased in sizeable quantities at $6.15 to $6.25 per gross ton on the cars at Boston, which compared to the prices of $18 and $20 prevailing a year and a half ago for the same grades of coal make understandable the statement that coal prices have been thoroughly liquidated in the bituminous field.

Pulpwood prices are slowly on the mend. Recent quotations have been $14 shipping point in central Maine. Large supplies are owned by the important pulp consumers.

The most rapid and noticeable rise in paper mill supplies during January was in waste papers. Unfortunately, the impression has been erroneously created that the board mills had corralled a lot of business. It merely happened that a number were in the market at the same time. Mixed papers rose to $9 and $9.50 f.o.b. shipping point, folded news to $11.50 and $12 and kraft paper to $1.80. Other old papers advanced somewhat, as heavy book stock sold late in January at $1.57½ delivered Fitchburg, soft white shavings at $3.30 f.o.b. Boston, hard whites at $3.90 and $4.

Rags excepting roofing mill grades were inactive. No. 1 and 2 roofings were bought by mills at $1.10 to $1.22½ delivered the mill. Large supplies account largely for the indifference shown by the writing mills for rags. At present white shirt cuttings are saleable in Holyoke at 9¼c and fancy shirt cuttings have actually been bought at 4¾c delivered, compared to asking prices of 5½c. No. 1 soft unbleached cotton sold at 9c.

Rope and strings show little activity, the deterring influence on rope being the indifferent state of the rope paper market, judged by the reduced production of mills making those papers. Strings are purchased in small quantities at $1.25 per hundred delivered the mill.

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A directory of the industries of Maine has recently been completed by the Maine State Department of Labor. It shows that the pulp and paper industry employed more people and paid more wages than any other. The pulp and paper industry employed 14,553 persons and paid wages of $17,624 annually. The value of the output of these paper and pulp mills is $95,235,000. When it is considered that the cotton mills had almost as many workers as the paper mills


**A. D. COOK, Inc.**

**Lawrenceburg** **Indiana**

FIG. NO. 50

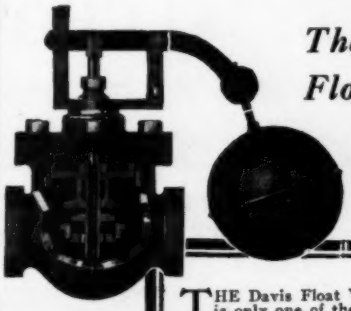
Manufacturers of Deep Well Pumps, Working Barrels, Rods, Foot Valves, Strainers and a full line of Water Well Supplies.

The accompanying half tone shows the COOK Patent Brass Tube Well Strainer with Standard Fittings, which are Bail Plug in the bottom and Foot of Blank and Lead Packer on top.

When the COOK Strainer is properly selected for the water bearing sand, capacity and method of pumping, it will successfully deliver the maximum yield of the well for many years free from sand and the troubles incident thereto.

***Write for Bulletin 30A***





***The Davis Float Valve—***

**For Paper Mills**

THE Davis Float Valve shown above is only one of the Davis Valve Specialties widely used in paper mills. The line includes pressure regulators for steam, air, water or oil, steam traps, balanced valves, float valves and many other steam savers.

All Davis equipment is simple—dependable—accurate. So certain is this that you may send for any Davis Valve Specialty on the basis of satisfaction or money back.

All paper mill operators should have the 72-page catalog. Shall we send your copy? Write the G. M. Davis Regulator Co., 414 Milwaukee Avenue, Chicago.

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STEAM SAVERS SINCE 1875

GROUND WOOD
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A UNIVERSAL CHOICE *for* PAPER MILLS

EQUIPPED WITH FORGED STEEL FLANGES
LIGHT STRONG DURABLE

Steel fittings made for your individual requirements. Valves for pulp lines in stock at all times.

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Our engineering department will help you solve your piping requirements

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and yet paid $3,000,000 less in wages, the high average level of wages in the paper mills can more readily be appreciated.

---

A most disheartening statement has been made by a man best able to make it on the pulpwood timber of the state of Maine. The forests of Maine which were thought to be inexhaustible have suffered a destruction equivalent to one-third of the standing pulpwood timber through the pernicious activity of the spruce budworm. James W. Sewall of Old Town, Maine, through his own efforts and those of his timber cruisers, have covered the state of Maine and estimates from these observations that a damage of $115 per capita has been wrought by the spruce budworm to the forests of Maine, particularly among the paper making growths.

About twenty-six townships, located in three counties, Aroostook, Piscataquis and Penobscot, were covered in the survey. The death damage varies from as light as 5 per cent of the spruce and 10 per cent of the fir discovered dead in some localities to 75 per cent of the spruce and 100 per cent of the fir dead in others. Damage to reproduction is much lighter fortunately.

Assuming that before the budworm devastation, the spruce and fir stand in Maine consisted of 80 per cent spruce and 20 per cent fir, the foregoing figures would indicate that 36 per cent of the total spruce and fir stands have been killed. The Sewall force has covered the whole state, and while they do not guarantee the figures for any particular locality, their observations lead them to conclude that the above deductions are not unreasonable. Taking the State Forest Commissioner's figures for 1917, there were then 52,000,000 cords of standing pulpwood in the state of Maine, and if it is allowed that one-third has been destroyed, the state would now have a stand of green wood amounting to 34,700,000 cords, intermingled with a dead stand of 17,300,000 cords.

Without allowing for salvage the money loss to the state would total $86,500,000. This is exclusive of the various other profits on the wood incurred in lumbering and manufacturing. It is readily appreciated that Forestry circles and paper and pulp men dependent on Maine pulpwood consider these discoveries appalling. While salvage may be had of some of the dead spruce, the dead fir is fast rotting and blowing down, entailing heavy expense if one wanted to log it. It is hoped that operations on the areas most badly afflicted will start at once.

---

The Cushnoc Paper Company and the Kennebec Paper Company of Augusta, Maine, have been adjudged bankrupt by Judge Peters in the United States District Court at Portland, Maine, on consent of both corporations. This action is subsequent to an order which was forwarded to Portland by Judge Hand of the District Court of the Southern District of New York. The text of this order is that adjudication of bankruptcy in that court is vacated, jurisdiction is relinquished and the proceedings are transferred to the Maine court. Inquiry into the financial affairs of both concerns will be made shortly by Referee Little of Augusta. It will be recalled that when voluntary petitions against these concerns were filed by New York creditors, there was a petition for appointment of receivers. Coincident with this action there were similar proceedings filed in New York, and it is the custom in the district courts to pursue the case in whichever court takes precedence. In order to expedite these proceedings it has been deemed best to transfer the proceedings to Portland, as most of the creditors are Maine people.

---

A new building costing $230,000 has been erected by the Great Northern Paper Company at Greenville, Maine. It is of fireproof construction, of steel and concrete, and the ground floor plan is 226 by 116 feet. A machine shop, woodworking room, repair and paint shop, tool and stock rooms, offices and other company departments will be housed in the new building.

---

The statement of the Falulah Paper Company of Fitchburg, Mass., shows a surplus of $190,000. Their machinery and real estate is valued at $325,000, cash of $39,000, merchandise of $120,000 and accounts receivable of $125,000. The accounts and notes payable total about $160,000.

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Edward L. Logan, Frances V. Logan and Stewart C. Woodworth, all of Boston, have incorporated the Henry Woods Sons Company of Wellesley and chemical house. Papers were filed at the State House, Boston, recently, showing a capitalization of $50,000.

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Fire believed to have been caused by an electrical spark caused the destruction of the Angier Mills, located at Ash-


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PAPER AND PULP MILL
KNIVES

Made by the World's largest makers of Machine Knives, Simonds Barker, Chipper, or paper cutter knives are the last word in knife manufacture. They stay sharp and do not crack or break on the hardest kind of work.

*Let your next order specify Simonds Manufacturing Co. Knives*

Simonds Manufacturing Company Established 1832
Fitchburg, Mass. Chicago, Ill.

Automatic Knife Grinder

Sharp, true, keen-cutting edges are the results of Knives sharpened on this machine.

This cut shows our Type "G" Grinder with Full Automatic Feed and Water Attachment

These essential features are clearly shown in this cut. Our Type "G" is "THE" Machine for the Paper Mill, as it will very readily grind Hog, Barker, Chipper and Paper Cutting Knives up to its capacity.

Type G in sizes from 28" to 72"
Type B in sizes from 54" to 139"

Guaranteed to eliminate your Knife troubles

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SAMUEL C. ROGERS & CO.
No. 22 Lock St., Buffalo, N. Y.
*"World's Pioneer Knife Grinder Builders"*

## Stickle Compound Condensing System
### and Automatic Steam Control
### *for Paper Machines*

As shown in the folder we sent out to the mills—"*How to Dry Paper*"—showing our Compound Condensing System for draining the dryers and heating the air with the discharge from the dryers to condition the machine room should interest you. We guarantee a saving of 20 per cent in steam consumed for this purpose.

**Open Coil Heater & Purifier Company**
Indianapolis Indiana
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ESTABLISHED 1828

*The* SMITH & WINCHESTER MANUFACTURING CO.
SOUTH WINDHAM CONNECTICUT

*Manufacturers of*

**Paper Making Machinery**

**Paper Bag Making Machinery**

**The Undercut Trimmer**

**Die Cutting Presses**

**Overcut Cutters**

***Let Us Quote on Your Requirements***

## *New Sand Filter*

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

***Send for full particulars***

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PHILADELPHIA, PA.

## EASTWOOD Wire Mfg. Co.

***Fourdrinier Wires***
***Cylinder and Washer Wires***

**Belleville, New Jersey**
**U. S. A.**

WE ALSO MANUFACTURE

***Valves, Unions, Cocks, Fittings, Digester Parts, Castings, etc., for Sulphite Mills from Our Perfection Bronze***

land, Mass. They were manufacturers of waterproof paper. Three buildings of stone and slate roofings, one 170 by 140, another 200 by 50, and another 270 by 50, were destroyed. The Angier interests bought these mills some eight years ago from the Jordan Marsh Company of Boston, who were the founders. Expensive machinery and a large amount of raw material made the loss heavy. It is believed that the property destroyed was worth fully $150,000 at a market value. It is believed to have been a paying property but no statement as to the owners' future intentions has been forthcoming.

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The Moore and Thompson Company mill at Bellows Falls, Vermont, reopened this month after idleness since last spring due to lack of orders. The mill has been repurchased by the original owners, Col. Frederick L. Thompson and F. A. Moore, of Bellows Falls, from the Eagle Paper Company of New York City, to whom the mill was sold February, 1920. Albert T. Buell of Wilmington, Vermont, formerly manager of the Deerfield Pulp and Paper Company, will be mill manager, with P. D. Switzer of Bellows Falls as assistant. William J. King of North Walpole, Vt., will be superintendent. Colonel Thompson has recently accepted the presidency of the Hercules Paper Company of New York City, controlling six paper mills in New York state and one in New Jersey, but the Bellows Falls plant will be an entirely separate proposition devoted as in the past to the manufacture of kraft and other coarse papers.

---

The Davis Paper Company of West Hopkinton, New Hampshire, have installed sixteen new dryers, a new pick-up cylinder, and remodeled their calender stock. This mill, which produces paper board, has been idle for some months, owing to the unfavorable conditions surrounding the paper board market, not the least of which was the ruinously low prices that have been prevailing. The mill, however, has made good use of its period of inactivity by the improvements outlined above, which is not all of the renovating that has made it possible for them to turn out a very high quality grade of chip board. It is expected that they will be operating by the time this appears in print.

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Charles H. Tiffany, traffic manager of the New England Paper and Pulp Traffic Association, in a masterly argument at Washington in January before the Interstate Commerce Commission plead for lower rates on coal bound for New England between the mines and tidewater at Hampton Roads. Mr. A. P. Lane, traffic manager of the Great Northern Paper Company, was also present as representative of his company. Mr. Tiffany later appeared before the commission to make out a case for lower through rates on pulpwood passing over American roads from a Canadian point of origin.

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If many orders like the one obtained by the Worcester Paper Box Company were scattered through the trade, a boom in box board would be underway in short order. The above mentioned company has just taken an order for the production of 50,000,000 paper boxes for Lever Brothers of Cambridge, Mass. J. Elmer Hallock, general purchasing agent for the last-named concern, states it as his belief that this is the largest order for paper boxes ever placed in the New England states.

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Citizens of Dalton, Mass., will erect a memorial to W. Murray Crane, former senator from Massachusetts, and one of the Crane family which operated the famous group of fine paper mills whose product is the paper on which a large part of the world's currency is printed.

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Newsprint continues to be an important item of export from Boston to Cuba. The United Fruit Company's steamers carry the paper to Havana. The San Benito left Boston recently with 500 rolls of newsprint.

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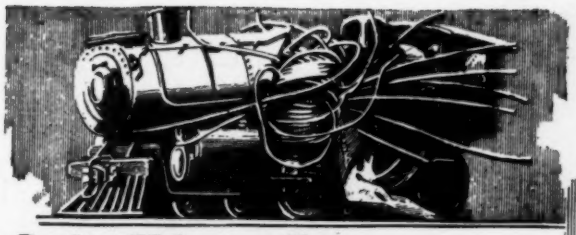
## Miami Valley

Dayton, February 1, 1922.

A change in the policies of the Vulcanite Roofing Company of Franklin, Ohio, became effective the first of this year, when the holding company, The Beaver Board Company of Buffalo, New York, changed their governing policies. Heretofore the purchasing, sales and other departments of the Beaver Board's various interests were centralized in Buffalo, and while the purchasing work will still be done at the Buffalo office, the sales and production will be handled from the

**Safety Valves will save Thousands of Fuses**

What would happen if the boiler of a railway locomotive were made of fibre the thickness of that used in fuse casing?

That is just what happens to fuses that are not constructed to let the pressure of gases escape quickly when there is a blowout. For blowouts, especially if caused by short circuits, frequently create a pressure higher than that carried by locomotives.

We have at last discovered a way to let the pressure of blowouts escape before it has time to do any damage to

**'UNION' RENEWABLE FUSES**

"Union" Renewable Fuses are now built with four safety valves on each end.

These safety valves consist of small vents or holes in the metal washers, but without a hole in the leather washers. So you see, when a link blows the pressure lifts the leather washers enough for gases to escape, yet not sufficient to permit any flame to pass. Simple, isn't it? So simple it's a wonder no one ever thought of it before. Yet it will save thousands of fuses from being blown to atoms.

"Union" Fuses have many other valuable features found in no others—features that make them the cheapest fuse on the market to use.

"Union" Fuses, both Renewable and Non-Renewable, are for sale by all leading jobbers and dealers.

They are approved in the very highest degree by the National Board of Fire Underwriters.

*New 96 Page Catalog*

**The "Union" saves more than ANY other renewable fuse**

**CHICAGO FUSE MFG. CO.**

*Manufacturers of Switch and Outlet Boxes, Cut-Outs, Fuse Plugs, Automobile Fuses, Renewable and Non-Renewable enclosed Fuses.*

**Chicago** **New York**

## Hunter "Shurflo" Wick Feed Oil Cups

**AUTOMATIC—Can be stopped and started at will**

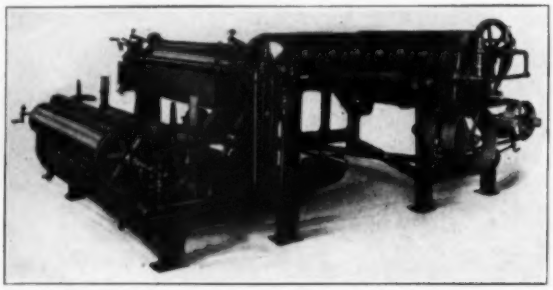
Capacities: ½ to 12 ounces with pipe thread connections ⅛" to ½"

REQUEST YOUR PURCHASING AGENT TO SECURE FOR YOU A TRIAL CUP

**Hunter Pressed Steel Co.**
600 Pierce Street, Lansdale, Pa.

## Wax Paper Coating Machines

**Carbon Paper Coating Machines**
**Gumming and Gluing Machines**



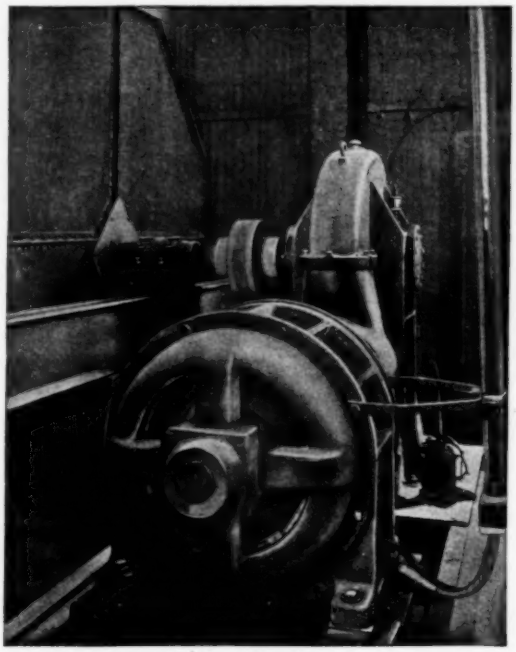
**Type 40-G. Semi and Full Wax Coating Machine.**
Patented in United States. Also in Great Britain, Canada and Germany.

This machine will coat one or both sides of the paper with the exact amount of wax desired; with finest high gloss finish on self-sealing bread wrappers, also on both heavy or light papers; it can absorb the wax entirely into the paper or retain most on the outside; also high grade dry waxed paper, and best grades of waterproof and oiled papers up to 72 inches wide, at a fast rate of speed. For light tissue waxing, use our Type 45-C.

*Write for particulars of machines in which you are interested. Submit your problems to our Engineering Dept. A.*

**MAYER COATING MACHINES CO.**
Rochester, N. Y., U. S. A.
CABLE ADDRESS—CARMATIC

## Cleveland WORM GEAR REDUCTION UNITS



**Cleveland Worm Gear Reduction Unit Applied to Belt Conveyor**

## 76% Repeat Orders

Analysis of our sales during 1921 shows that 76% of the total volume came from repeat orders. This is the way it has been ever since we started making speed reduction units. *The largest proportion of our business has come from concerns who bought one or more units, tried them out and then bought more.*

Our first sale was to a rubber mill—now our product is used in steel mills, paper mills, water works, macaroni factories, cement mills, coal mines, steam turbines, stockyards in connection with conveyors, precious metal mills, glucose factories, naval operations, tobacco factories, pulp mills, etc.

From which it is perfectly obvious that *Cleveland Worm Gear Reduction Units make good.*

Wherever even torque, low maintenance cost, compactness, quietness, durability, efficiency are important Cleveland Worm Gear Reduction Units should have immediate and careful investigation.

*Our Engineering department is always glad to co-operate. Write us your problem.*

**The Cleveland Worm & Gear Co.**
*America's Worm Gear Specialists*
**CLEVELAND, OHIO**

New England Representatives
**FRANKLIN MACHINE CO., Providence, R. I.**
Pacific Coast Representatives
**ALFRED H. COATES CO., San Francisco, Cal.**

Vulcanite Roofing Company's Franklin office. John Logan, who was formerly vice president, is now general manager and vice president, with full authority.

The statement was made at the Vulcanite Roofing Company's office that this is the time of year when business is best with them. The spring building program is being planned, and orders are coming in regularly, most of them being for immediate delivery. In spite of the general depression in 1921, this company had a good year, evidently, for their saturating plant has not lost more than a week's time in the whole year.

### Superintendents' Meeting

The regular meeting of the Miami Valley Division of the American Pulp & Paper Mill Superintendents Association was held on January 21st, at the Elks' Club in Middletown, Ohio. The meeting was called at 3:30 p. m., and three parties were formed to visit the mills in and around Middletown. One party visited the board mills, one the tissue and blotting mills and one the book and writing mills. Following this the superintendents were the guests at dinner of Mr. Charles Shartle, of Shartle Brothers' Machine Company, of Middletown.

After dinner, Mr. Benjamin F. Soffe, Michigan representative of The Permutit Company, of Chicago, gave a very interesting talk on water, its impurities and the rectification of them, illustrating his remarks with a miniature Permutit outfit for removing the hardness from water.

Following this was a discussion on the value of bronze as a Jordan filling. Homer Martindale, secretary of Shartle Bros.' Machine Company, of Middletown, read a paper on the subject, and there followed a general discussion to the effect that Jordan fillings of bronze wear from five to eight times as long as steel fillings. Those superintendents who had used bronze fillings were strong in praise of them.

Following Mr. Martindale's talk, small bronze chisels were distributed among the superintendents and their guests, who were invited to try them out on the steel filling furnished for that purpose. The men crowded around the filling, and the room rang with the blows of metal on metal.

Next came a discussion as to what makes paper curl. Various reasons were given, and several tentative suggestions for remedies were offered, but the hour was late, so this question was carried over for further discussion at the next meeting on February 25th.

Mr. Shartle, who seems to have the welfare of the Superintendents Association very much at heart, offered to provide the same room at the Elks' Club for the next meeting if they would hold it in Middletown. His offer was accepted, committees appointed to prepare the menu for the next meeting and arrange for the speaker, and the meeting adjourned.

Fifty-two men attended the January 21st meeting, and the superintendents hope to have even a larger attendance on February 25th.

### Establishes New York Office

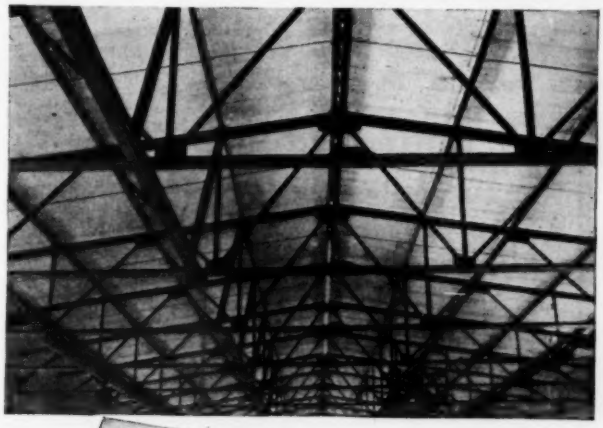
Mr. Z. W. Ranck, president of the Crystal Tissue Company, of Middletown, Ohio, has been in New York since about the 10th of January in connection with the establishment of a sales office and warehouse to carry their goods. The New York City warehouse is now completely stocked with standard lines from which emergency orders can be delivered on short notice. Inquiries which formerly had to be sent to the Crystal Tissue Company's Middletown, Ohio, office can now be answered from the New York office, which means that customers' quotations will be in their hands three or four days sooner than heretofore.

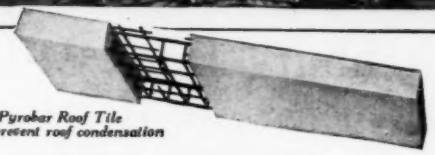
W. E. Piper, who has for several years been connected with the Crystal Mill at Middletown, is in charge of the New York office, located in the National City Bank Building, 17 East 42nd street. This is the sixth sales office the Crystal Tissue Company has established within the last twelve months.

George Houk Mead, president of the Mead Pulp & Paper Company of Dayton and Chillicothe, has gone to Aiken, S. C., where he will spend the balance of the winter with his wife and family.

## H. E. Stafford Heads New York Superintendents

At the annual meeting of the Northern New York Division of the American Pulp and Paper Mill Superintendents Association, held at the Black River Valley Club, Watertown, New York, on January 20th, Mr. Homer E. Stafford, superintendent of Knowlton Brothers, Inc., Watertown, New York, was elected Chairman to succeed Mr. Corwin T. Jewell, and



*Type of Pyrobar Roof Tile used to prevent roof condensation*

# This roof won't rot!

No roof decking for machine rooms can give complete satisfaction unless it is able to prevent the condensation and dripping of moisture on the underside and is able to resist rot.

**USG PYROBAR ROOF TILE**

made of a specially prepared gypsum, meet both requirements. Their low conductivity makes them non-condensing and non-dripping. Their dense, rock-like nature insures a fireproof, permanent, economical construction. Ask for estimate on Pyrobar Roof Tile.

**UNITED STATES GYPSUM CO.**

*World's Largest Producers of Gypsum Products*

GENERAL OFFICES

Dept. S, 205 W. Monroe St., Chicago, Ill.

SALES OFFICES

New York, N. Y., Buffalo, N. Y., Boston, Mass., Washington, D.C., Philadelphia, Pa., Pittsburgh, Pa., Cleveland, Ohio, Cincinnati, Ohio, Detroit, Mich., Milwaukee, Wisconsin, Minneapolis, Minnesota, St. Louis, Missouri, Kansas City, Missouri, Omaha, Nebraska, Denver, Colorado, Los Angeles, California

MINES AND MILLS

Oakfield, N. Y., Plasterco, Va., Cleveland, Ohio, Gypsum, Ohio, Genoa, Ohio, Detroit, Mich., Alabaster, Mich., Grand Rapids, Mich., Milwaukee, Wis., Fort Dodge, Iowa, Blue Rapids, Kan., Southard, Okla., Eldorado, Okla., Piedmont, S. D., Loveland, Colo., Denver, Colo., Arden, Nev., Amboy, Calif.

# CASEIN

**Standard Quality**
**Lowest Prices**

**The Casein Manufacturing Company**

**15 Park Row** **New York**

# The Pulp and Paper Trading Co.

**21 East 40th Street** **New York City**

Dealers in Domestic Chemical and Mechanical Pulps and Paper

AGENTS FOR
J. & J. Rogers Company, Au Sable Forks, N. Y.
Canadian Kraft, Ltd.
Dealers in Wayagamack Kraft
Three Rivers, Canada
Ware Coated Paper Company, Ware, Mass.

EASTERN AGENTS FOR
Port Huron, Michigan, Sulphite
Made by Port Huron Sulphite & Paper Co., Port Huron, Mich.

# Fitchburg Duck Mills

ESTABLISHED 1844
FITCHBURG, MASS.

MANUFACTURERS OF
STANDARD AND MULTIPLE
**DRYER FELTS**

English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

**Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.**

# RUSS GELATIN CO.

**Factory—WESTFIELD, MASS.**

MANUFACTURERS OF
**GELATIN and GLUE**
**ANIMAL SIZING** **GLUE STOCK**

LARGEST SPECIALISTS IN AMERICA ON
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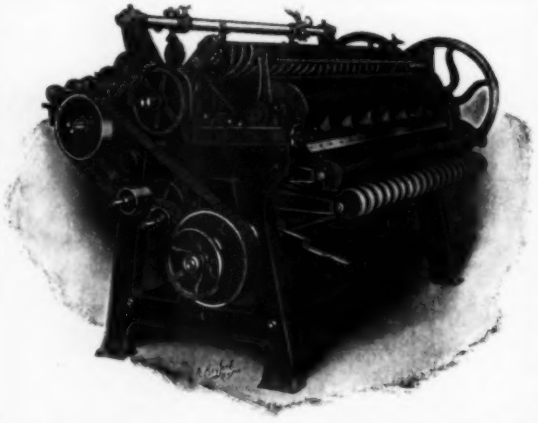
**E. F. RUSS COMPANY** 201 Devonshire S. BOSTON, U. S. A



# PAPER CUTTERS

Single, Duplex, and Diagonal

CUTTER KNIVES
PATENT TOP SLITTERS

**Hamblet Machine Co.**
LAWRENCE, MASS.

# Perforated Metal Screens

**in all metals for pulp and paper mills**

**Elevator Buckets (Plain and Perforated)**

**Conveyor Flights and Trough**

**General Sheet and Light Structural Work**

**Light and Heavy Steel Plate Construction**

*Write for perforated metal handbook*

**Hendrick Mfg. Company**

**Main Office & Works** 51 Dundaff Street Carbondale, Penna.
**30 Church Street** New York City
**915-916 Union Bank Building** Pittsburgh, Penna.

Michael J. Argy, superintendent of Cliff Paper Co., Niagara Falls, New York, was elected Secretary to succeed Mr. T. H. Hammond.

The meeting was called to order by President Jewell at 2:30 in the afternoon and dinner was served at the Club at six o'clock. The program consisted of a paper on "The Illumination of Pulp and Paper Mills," by William G. Lewis, of Knowlton Brothers, Inc.; "The Abuses and Uses of Rubber Press and Carrying Rolls," by H. B. Adams, of the Stowe and Woodward Co., Boston; "Automatic Magazines and Pulp Grinding," by M. J. Argy, of the Cliff Paper Co., and an illustrated picture lecture by H. M. Rice and W. F. VanRiper of the DuPont Dye Works, Wilmington, Del.

## Connecticut Valley Branch Cost Association of the Paper Industry

The next meeting of the Connecticut Valley Local of the Cost Association of the Paper Industry will be held in Holyoke at the Hotel Nonotuck, February 20, 1922. The speaker of the evening will be Joseph A. Borden, director of general service, American Writing Paper Company.

Mr. Borden was the speaker at the dinner held in connection with the fall meeting of the Cost Association of the Paper Industry at Chicago, and those present at that meeting were very much pleased with the address given by him. Those who have not had the opportunity of listening to Mr. Borden's previous talks will no doubt avail themselves of this occasion.

Mr. Borden is an enthusiastic speaker, and he talks from a practical experience which he has had in the printing business. It was he who sold the standard cost system to the U. T. A. Practically every printer today is running his business on his cost system which has been established and endorsed by the U. T. A. Mr. Borden thoroughly realized the value of a standardized cost system and how it benefits an industry, and now he is willing to come here from Chicago and address this local on the same subject.

His talk will be equally interesting to executives, superintendents, cost men, and all, whether manufacturers or converters.

Will you assist us in securing a very large meeting on this date? We want the cost man to urge his executives to be present so that they may learn how the Cost Association is doing its utmost to promote uniform and standardized cost throughout the paper industry.

This is an advance notification of the regular notice, so please have your officials put a circle around the date (February 20th), and reserve it for this cost meeting. A personal drive is to be made upon the executives of the companies in this vicinity, but a little word from the cost man to the executive undoubtedly will go a long way.

Talk it over with your superintendent; ask him if he would not like to listen to an address given by a man who is not talking simply to hear himself talk, but who is talking for the sole purpose of promoting good costing principles in the paper industry. We have had several speakers at the local meetings and each one has told in his own way just what we wished to learn and how we could accomplish our object if we went about it in the proper way. Mr. Borden will tell us the principles of the cost system endorsed by the U. T. A, and how they are working out after three years of practice. If I am any judge of this kind of work, permit me to say that I think this discussion will be the best yet, so if you will reserve this date for the Connecticut Valley Local and kindly do your bit in getting as large an attendance as possible, we will accept that spirit as your appreciation of our efforts.

## Joint Committee Meeting of Felt Manufacturers and T. A. P. P. I.

At the Biltmore, New York City, on January 19, 1922, there was held a meeting of the Joint Committee of the Felt Manufacturers' Association and the Technical Association of the Pulp and Paper Industry to consider felts used in paper and pulp mills. The following were present:

F. C. Cowdery, Albany Felt Company, Albany, N. Y.; M. C. Burrell, Orr Felt & Blanket Company, Piqua, Ohio; H. M. Ashby, F. C. Huyck & Sons, Albany, N. Y.; Roger Williams, Draper Brothers, Canton, Mass.; G. H. Harvey, Gardner-Harvey Paper Company, Middletown, Ohio; H. F. Obermanns, Hammermill Paper Company, Erie, Pa.; G. D. Bearce, News Print Service Bureau, New York, N. Y., and W. G. MacNaughton, secretary of T. A. P. P. I., New York, N. Y.

In a full discussion of felts from the standpoint of both the felt manufacturer and the paper mill, many valuable sugges-

Standard Ultramarine Blues
For the Paper Industry
ASK FOR SAMPLE OF
NEOS R BLUE
The Highly Alum-Resisting Ultramarine
AGENTS
E. M. & F. WALDO, 10 High Street, Boston, Mass.
THE WESTERN PAPER MAKERS CHEMICAL COMPANY
Kalamazoo, Mich.
Manufactured by
THE STANDARD ULTRAMARINE CO.
Huntington, West Virginia

Hamilton Top Felts
run until worn out, with less trouble of "picking" on machine than any other make of top felts can show. A trial is invited
SHULER & BENNINGHOFEN
HAMILTON, OHIO

THE NEWPORT COLORS for Paper
Newport Acid Bordeaux B Conc.
and
Newport Paper Red 2 B
Two products of good coloring power for both lighter and deep shades.
NEWPORT TRADE MARK "COAL TO DYESTUFF"
Newport Chemical Works, Inc.
Passaic, New Jersey
Branch Sales Offices
Boston, Philadelphia, Greensboro, N. C., Chicago
Providence

# Wanted

One nine-roll *72"* supercalender including electric drive. If not electric driven, advise type of drive. Also advise make of stack and drive, and if they can be seen in operation. Address Lakeview Paper Company, Appleton, Wis.

**For Sale**

One New 64" Seybold Automatic Cutter at a Bargain.

C. A. LAWTON CO.,
De Pere, Wis.

*Nothing Needed But a Hammer*

**ALLIGATOR**
TRADE MARK REG. U.S. PAT. OFFICE
**STEEL BELT LACING**
Ask Your Belting Supply House or Write Us for Prices and Samples.
Reg. U.S. Pat. Off.
Never Lets Go
Send for Valuable FREE Book
The Strongest Belt Lacing on Earth
FLEXIBLE STEEL LACING CO., 4675 Lexington St., Chicago, Ill.

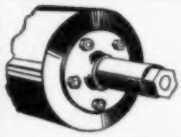
**USE**
# Claflin Continuous Beaters

In these days of reconstruction and industrial readjustment, ECONOMY is the byword of business progress.

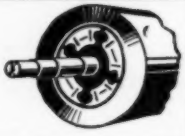
CLAFLINS make for increased production, greater ECONOMY, stronger, finer and more uniform pulp. Best of all, they will meet any beating demand.

*Let CLAFLINS solve your beating problems*

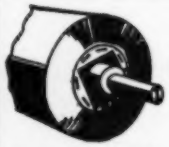
**The Claflin Engineering Company, Lancaster, O.**



**SERVICE**
**Wood Rolls**



**A Construction for Every Service**



*Free Blank Roll Blue Prints sent on request to any Paper Mill*

**Rodney Hunt Machine Co., 45 Maple St., Orange, Mass.**

## Rebuilt Paper Mill Machinery in Stock and Guaranteed

*Not Where Is and As Is*

**FOURDRINIER TISSUE MACHINE**—One 96", one 72".
**FOURDRINIER PARTS**—Pusey & Jones 118", 100". Kutter Trowbridge 96".
**PRESS PARTS FOR PAPER MACHINES**—Pusey & Jones Bell Crank housing, two sets 18"x96", Black & Clawson swing arm housings with rolls.
**DRYERS**—Four 48"x111", four 48"x68", one 84"x67", eleven 42"x66".
**MARSHALL DRIVES**—Three Black & Clawson self-contained stand with friction clutch cone pulley and 6" mortise gears. Mortise gears and pinions for Pusey & Jones Marshall drives 5" to 8" face.
**CHILLED CALENDERS**—One 66" face, five roll, one 54" face, five roll.
**DILLON DOCTORS**—For Machine Calenders 60" to 120" face.
**SLITTERS** and **WINDERS**—One 120" Warren, one 108", 36" Kidders.
**REELS**—Pusey & Jones two drum upright 48" to 114".
**BEATERS**—Six 72"x42" Noble & Wood, two 66"x42" Noble & Wood, equipped with three cylinder washers; one Dilts 62"x50" iron tub, one Jones 62"x52", seven Horne 36"x36".
**JORDANS**—One Wagg Majestic, three No. 2 Dillon Improved, one Large Horne, five Monarch, two Pope Brushing engines.
**SCREENS**—Three 12 plate open side Packer. Six 10 plate. Two six plate.
**STUFF PUMPS**—Deane triplex 8"x12", Gould triplex 8"x10", Sandusky triplex 4"x6".
**REVOLVING SHEET CUTTERS**—One 104" Horne, one 50" Hamblet diagonal, one 42" Finlay, four 61" Hamblet, four 61" Finlay.
**WET MACHINES**—Four 72" Bagley & Sewall Hydraulic.

**We have a large number of pumps and over five hundred calender, press and couch rolls in stock.**

## Frank H. Davis Company

**175 Richdale Avenue, Cambridge, 40, Mass.**

**Fly Bars**
**Bed Plates**
**Jordan Fillings**
**Knives**

**For all makes of Machines**

**For all classes of work**

We can offer a desirable and dependable source of supply.

Let us quote on your requirements.

## JOHN W. BOLTON & SONS, Inc.

**Lawrence, Mass.**

*High Grade Fly Bars, Bed Plates, Jordan Fillings and Knives.*

tions were brought out which, if generally adopted, it is believed would result in lower costs to the paper mill as well as to enable the felt manufacturers to give more intelligent service to their customers. It was suggested that the dimensions of felts be standardized to even feet in length and to even inches in width, and by such standardization a greatly increased economy in manufacture would result.

It was also suggested that all orders for felts be accompanied by a data sheet giving full information covering machine conditions and kind of service desired. Mr. George H. Harvey agreed to prepare the data sheet, the details of which were discussed, and to submit it for the committee to the paper mills and felt manufacturers of the country for criticism and approval. The tentative form, which may be modified before being adopted, is as follows:

**Felt Data Sheet**

Attached to order No. .....

For (name of company)..... Address.....
Date..... Mill..... Machine No.....
Position on machine..... Style of felt.....
Type of machine (Cylinder, Harper, etc.).....
Speed of machine..... Width of press rolls.....
Size of felt required..... Kind of paper.....
Suction box or suction press used.....
Kind of press roll: Top..... Bottom.....
Remarks.....
For cylinder felts..... Number of cylinders.....
Number of primary presses.....
Number of cylinders and primary presses driven.....
Number of suction rolls or boxes to each felt.....
Maximum speed.....
Are rollers or ball bearings used on cylinders?.....
Remarks.....

Another meeting was arranged for the time of the annual meeting in April, at which it is expected a general program can be adopted.

Among the suggestions brought out covering the use of felts, including desirable lines for investigation, are the following:

A standard method of calculating felt efficiency should be adopted. The one suggested is "pounds of paper per pound of felt" as used by the News Print Service Bureau.

An appreciation of the abrasive action on felts, of suction boxes, whippers, guide rolls, spread rolls and bars, felt carrying rolls, and a study of methods to lessen this abrasive action.

The regulation and reduction of tension on bottom cylinder wet felts on board machines, and the desirability of the measurement of this tension by a recording instrument.

The injury done to felts is in washing with strong alkali or with hot water. A good soap or a mild alkali such as sal soda and water, not over 120 degrees Fahr., should be used. If felts are washed in a felt washer, care should be taken to avoid shrinkage and pulling of the fabric. In drying the felt it should be kept in tension by hanging it up and using a roll for a weight.

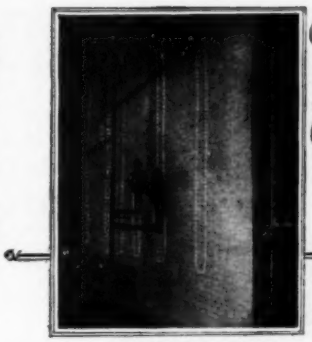
Particular care should be used when a new felt is put on a machine. Every machine man should know what to avoid in breaking in a new felt, but many apparently do not. These should be instructed.

The effect on operation and efficiency of felts is the quality of the water in any locality. The most desirable from the felt standpoint is soft water having a low degree of hardness and free from iron and alkali.

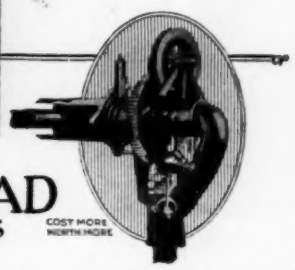
Respectfully submitted, W. G. McNaughton, secretary.

## U. S. Department Honors Paper Manufacturer

The paper industry has been again given governmental recognition in the naming of its well known representatives as a delegate to the national farm conference which was held at Washington the week of January 23. George W. Sisson, Jr., of Potsdam, N. Y., former president of the American Paper and Pulp Association was asked to serve by Secretary Wallace of the Department of Agriculture, who made up the list. Mr. Sisson, in addition to his work in the manufacture of paper, has long been deeply interested in dairying, and was a leader in the organization of the Jersey cattle breeders of the country. He was for several years president of the New York State Agricultural Society, and only a year ago was on the Pacific Coast to judge cattle in an important Oregon cattle exhibition.

Practically Complete Elimination of Condensate Obtained



DIAMOND
VALV-IN-HEAD
SOOT BLOWERS

COST MORE WORTH MORE

ONE of the most important results of the use of the Valv-in-Head soot blower is the practical elimination of the possibility of water entering the portion of the soot blower inside the boiler. With all other blowers, the valve is located anywhere from 2 to 15 feet or more from the head. This means that condensation will inevitably take place when the valve is opened and steam is admitted to the cold line. The water thus formed is driven through the soot blower head and into the blower element.

In addition to the condensate thus formed in the line, a more serious possibility is that a small leak in the valve will cause water to form in the pipe before the valve is opened. When this occurs a solid column of water may be built up in the riser pipe and carried over into the boiler when the valve is opened.

With the Valv-in-Head system, any condensate in the main supply line is discharged through the drain pipe before blowing begins. There is, therefore, no water below the valve which can be carried into the blower head and the radiation area in the head itself is so small as to be negligible. Hence we have practically complete elimination of condensate from the blower element.

**CONSTRUCTIONAL FEATURES**

*The valve is made with Monel metal disc and seat. Both the stem and its retaining nut are made of nickel steel. In order to secure extra hadness, which insures durability, the end of the stem is heat treated.*

*Action of the cam and trigger are positive, assuring complete opening of valve at each revolution. Trigger, cam and clamps are steel, spring is chrome vanadium.*

*Ball thrust bearings—a new feature on soot blowers—are provided to relieve friction caused by thrust of unit. Special patented contruction makes head full floating, permitting movement of unit in any direction as boiler walls expand or contract.*

Valv-in-Head construction, therefore, means increased length of service of boiler tubes; complete removal of soot with no gummy deposits left behind, and long life of soot blower elements, with a reduction in annual blower maintenance charges from 25 to 50 per cent.

This is only one of eleven important advantages of Diamond Valv-in-Head soot blowers. Every boiler needs a mechanical soot blower and you will save money by buying the best.

*Diamond Valv-in-Head Soot Blowers are described and illustrated in detail in our new Bulletin 297. Write for your copy.*

DIAMOND POWER SPECIALTY COMPANY
Detroit, Michigan

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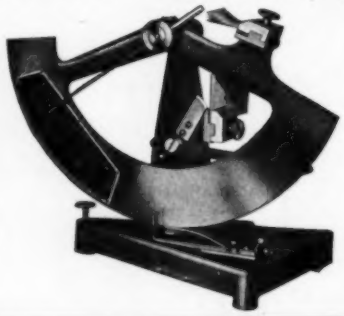

The tearing strength of paper is for many purposes its most important property and always helps to determine its quality and value. **Don't guess at it.** The

**ELMENDORF PAPER TESTER**

actually **measures** the tearing strength.

*Write for Bulletin 17 on Paper Testing Instruments*

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This fountain includes a barrel of 1¾" thick oak, painted outside; cover of double thickness; galvanized pipe coil through which water passes to drinking head without coming in contact with ice, and a heavy vitreous china bowl with either cast brass bubbling head with self-closing stop or "Vertico-Slant" stream from which glass can be readily filled.

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**ALL INDUSTRIAL USES**

**WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.**

### Combustion Eng. Corp. and Geo. J. Hagan Co.

Mutually satisfactory arrangements have been made between the Combustion Engineering Corporation and the George J. Hagan Company of Pittsburgh, whereby the Hagan Company discontinues representation of the Combustion Engineering Corporation.

The Combustion Engineering Corporation has opened its own office in the First National Bank Building, Pittsburgh, Penn., and will soon open an office in Cleveland, Ohio, both of which will be in charge of Mr. W. C. Stripe, former manager of the Philadelphia office.

The George J. Hagan Company will retain the exclusive agency for the Type "H" Stoker, formerly known as the American Stoker, for use in Hagan Industrial Furnaces.

### New Sales Connection

The Rathbun Jones Engineering Company, Toledo, Ohio, has appointed the Ingersoll-Rand Company, New York, General Sales Agent for Rathbun Gas Engines. The large sales organization and service department of the Ingersoll-Rand Company, combined with the fact that gas engines are used to drive compressors, pumps and other machinery which it manufactures, places it in a position to serve better the users of gas engines and other machinery.

Rathbun Gas Engines are well-known to the trade as they have been in successful operation for over twenty years. They are of the vertical, multi-cylinder type and are built to operate on Natural, Illuminating, Producer, Coke Oven, Oil Still and other forms of gases which can be successfully handled in an internal combustion engine. Sizes range from 100 brake horse power to 1,450 brake horse power.

Reports indicate that there is a possibility of new paper and pulp mills in a number of different points where paper has not been made heretofore. These reports include a pulp mill for Grayling, Mich.; a paper mill at Beaumont, Texas; a paper mill at Omaha, Nebr., with the possibility that the Robt. Gair Co., of Brooklyn, will build another plant in Connecticut.

Paper cartons have found another use. The big flour mills have taken up the idea of shipping out flour in five pound box board cartons. It is claimed that this will keep the flour in a much cleaner and better condition than the old flour sacks, and will be much more convenient for the users. If all of the flour that is used in this country is put up in cartons, it would mean a tremendous tonnage of box board daily.

The Kalamazoo Vegetable Parchment Co., of Kalamazoo, Michigan, has added another important line to its already popular K. V. P. brands. This company will turn out a line of onion skin papers and will be sold through C. A. Hubbard, who is building up a large business in paper specialties. Mr. Hubbard was formerly sales manager for the Bryant Paper Co.

Charles A. Blaney has been elected president of the Eddy Paper Co., with mills at Three Rivers and White Pigeon, Michigan, to succeed Oscar Gumbinsky. Mr. Blaney is a well known man in paper mill circles in Kalamazoo, being head of the large supply houses which have furnished considerable in the way of steam fittings, etc. for paper mills in that territory.

The Wodack Electrical Tool Corp., of Chicago, is now turning out a new tool which could no doubt find many places for usefulness around paper mills. It is a portable electric drill and grinder and can be used for drilling holes in metal or wood, or with the grind wheel attachment. Master mechanics and other men around the paper mill can find many uses for this little tool.

The Nash Engineering Co. of South Norwalk, Conn., has recently issued a bulletin No. 18, describing the Jennings Hytor Vacuum Heating Pump, which is printed in colors and tells about the advantages in this pump for use on return line heating systems, drying exhaust in paper mills and other vacuum mills. This bulletin is exceptionally interesting.

The first blotting paper made in Canada was recently turned out by the Howard Smith Paper Co., Ltd., of Beaubarnois, Quebec, Canada. Canada has annually imported about $500,000 worth of this paper.

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*We are anxious to become so well known that when a man thinks of tanks he will automatically think of CURTISS-WILLIS. We are building and selling new tanks of all kinds in every part of the country.*

A report from W. L. Schurz, American attache at Rio de Janeiro, states that the American paper trade in Brazil is seriously threatened by Germany, Scandinavia, and other European countries. Mr. Schurz states that the American representation in South America is generally inadequate, and that the European manufacturers are offering much better credit terms.

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The partnership of Trimbley & Allen has been dissolved. The business has been purchased by E. J. Trimbley and will be continued by him under the name of Trimbley Machine Works at Glens Falls, N. Y. M. G. Tibbitts will continue as sales manager, Harold D. Wells and T. A. Gastonguay will act as salesmen and erecting engineers.

---

The new pulp mill that has been in the course of construction at Commerce, Texas, has been started up. The raw material used by this plant will be cotton linters and cotton hull fibre. It is expected that the company will, a little later, build a paper mill at this point.

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Announcement is made of the consolidation of the John Hoberg Company and the Green Bay Paper and Fiber Company, of Green Bay, Wis. The business of the two companies has been taken over by a corporation to be known as the Hoberg Paper and Fiber Company. The consideration involved in the transaction was about $3,000,000.

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It is stated that the Bureau of Standards at Washington is to make tests as to the advisability of using tobacco stems as a raw material for paper. This matter is being pushed by Congressman Chas. F. Ogden, of Louisville, Ky.

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M. J. Niks, formerly superintendent of the Kalamazoo Vegetable Parchment Co. at Kalamazoo, Michigan, has accepted a position as superintendent of the Chillicothe Paper Co., at Chillicothe, Ohio, and took charge on February 1.

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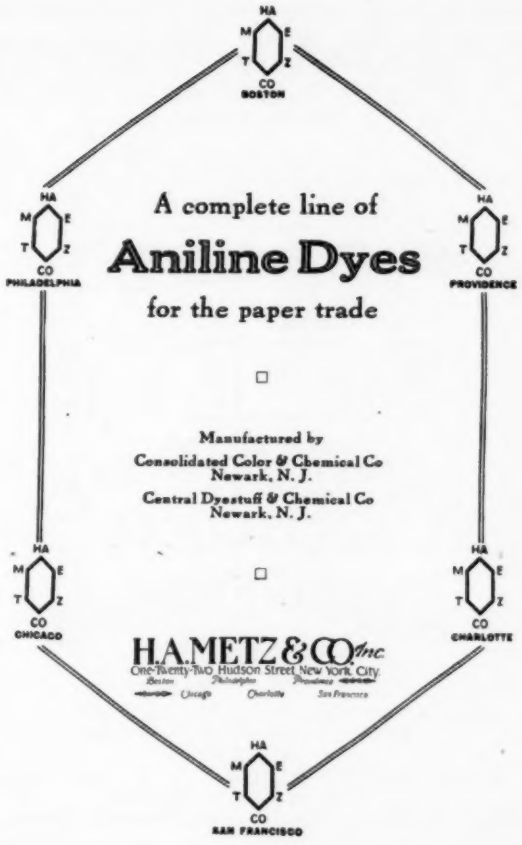
Canadian pulp and paper exports in December, 1921, were valued at $10,325,533, compared with $14,612,083 in December, 1920. Newsprint and all classes of pulp show increases in volume over last year, however, despite decreased values.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*"Wolverine" Waxed Papers for Every Requirement*

Best Quality

*Waxed Tissue a Specialty*

OTSEGO, MICHIGAN

New York, Feb. 1, 1922.

ALTHOUGH the paper market has not opened up to the extent that many in the trade anticipated at the outset of the new year, the situation as a whole shows improvement, and proof is not wanting that the market is gradually working into a position where much larger business can be expected in most kinds of paper and where conditions generally will be more satisfactory than they have been in some time. Paper consumers thus far continue to operate as buyers on a reserved scale. Few are absorbing supplies unless actually and immediately in want of paper, and yet there are numerous indications that activity in the consuming industries is on the rise, thus creating a broader outlet for paper. The rather slow position of the market during January caused little or no surprise among paper manufacturers and dealers. There were of course many who looked for demand to expand with more rapidity than it has, but opinion has been common that improvement would come about very gradually, that consumers would not increase their purchasing until warranted by more favorable conditions in their own fields, and the trend of market conditions in the last month has been simply running true to the form expected by a large majority in the paper trade.

Most kinds of paper are characterized by a moderately good demand. There is not enough buying to keep all mills running at capacity, but nevertheless paper manufacturers as a rule are obtaining sufficient business to warrant a fair percentage of production, and the movement of paper supplies is consistently increasing. A highly encouraging factor is that general business conditions are at last definitely on the mend, that the public at large is regaining faith in the stability of commodity prices and is slowly but surely resuming buying of various articles of merchandise on something approaching a normal scale. The big men of the country—the bankers, economists and other students of commercial and trade conditions—have argued since the period of after-the-war readjustment set in that business could not begin to revive until this all-important condition was effected, and now that the consuming public has reached the conclusion that prices really are at the point of complete stabilization, steady improvement in business can be confidently expected.

Unfortunately the holiday period interrupted the pick-up in activity in the paper market to no small degree. This is not an unusual occurrence as demand for most kinds of paper invariably eases off toward the close of the year and during the first few days of a new year, but this season this situation was more accentuated than is ordinarily the case. The reason was manifest. Consumers in a great many instances were not fully convinced of the healthiness of the marked improvement in paper business during the last two or three months of 1921, and as the year neared an end they gradually reduced their absorption of supplies, thus causing the market to again become quiet. Since then there has been a more or less hesitancy to resume buying excepting on a narrow scale, but in the last few days demand for paper has shown considerable quickening and everything would seem to point to the market being well on the road to greater activity and more normal conditions.

Figures recently compiled show that newsprint paper is in a distinctly strong statistical position. Consumption of newsprint in the United States last year was within two per cent of the consumption in 1920, whereas production in 1921 was only 80 per cent of the 1920 production, this drop being due chiefly to labor troubles in paper mills. The deficit was met last year to some extent by importations of print paper from Europe and Canada, but mostly from the stocks of consumers, who in the latter part of 1920 accumu'ated large stocks of paper in the fear of not being able to obtain sufficient supply to meet their requirements during the boom period. The result has been a steady reduction in surplus holdings of newsprint until on January 1, 1922, publishers' stocks represented but 39 days' average supply. Consumption of newsprint has consistently mounted for the last three to four months and is believed to be now running close to the maximum level of consumption reached in 1920, and while mills in the United States are rapidly smoothing over their labor difficu'ties and increasing their output, production is still somewhat below normal. The danger of foreign competition seems to be gradually disappearing. It is unlikely that importations of print paper will rise further; for one thing, domestic prices are too near European prices to make this market tempting to foreign producers of newsprint. Moreover, it is contended that present newsprint prices quoted by United States manufacturers exist mostly at the expense of the income account. Practically no wood is being bought and very little is being cut. Figures of some eighteen manufacturers for the first ten months of 1921 show a cost to produce newsprint of $69 a ton. This includes operation at the peak wage scale up to May 1, with a 22 per cent cut thereafter. Recently manufacturers representing about 25 per cent of American and Canadian manufacturing capacity inaugurated a second wage reduction of about 20 per cent. With this cut in effect and wood written down $20 per cord, the eighteen mills above mentioned report a present cost of $62.50 per ton to produce newsprint. Taking these figures as an indication, there seems little room for further decline in newsprint prices, particularly since demand is now of ample scope to absorb all the current production and more.

Demand for newsprint has been fairly lively since the first of the year, when revised prices on a basis of 3.50 cents per pound at mills became effective. Publishers have ordered supplies with comparative freedom and have seemed to regain confidence in the stability of prices. Most newsprint mills, excepting those bothered by labor difficulties, are running at close to full output and are shipping out paper as quickly as it becomes available. Spot quotations range from a quarter to a half cent per pound above the contract basis. Sheet news is selling at 4 to 4.25 cents per pound.

Book papers are under somewhat more inquiry than in some time and the market for this class of paper seems definitely tending toward improvement. Machine finished book is quoted at 6 to 6.50 cents a pound, with the large producing mills mostly obtaining the higher figure. Wrapping papers are steady in price and are moving in good amounts, with a majority of mills said to have enough orders on hand to keep them going for a month or longer. Tissues have advanced a trifle. No. 1 white tissue is quoted at 90 cents to $1 a ream, whereas not so long ago sales were being made down to 80 cents a ream. Fine papers are steadily growing livelier and mills are finding it necessary to increase their operations to fill orders. The leading producing organization last month announced a reduction of from 1 cent to about 6 cents per pound in bond papers ranging in price from 20 to 46 cents a pound, and an advance of a cent to a cent and a half in bond lines previously priced at 11¼ to 19¼ cents a pound. The rise in the cheaper grades, it was stated, was due to the higher price of sulphite pulp. Paper boards have experienced a rather slow market recently, but buying is now increasing and mills in most cases have advanced quotations to about $40 per ton f. o. b. consuming points on plain chip and $42.50 to $45 a ton on news board.

## U. S. Exposition Building at Rio

The contract for the construction of the exposition building to house the exhibits of the United States at the great Brazilian Exposition next September has been awarded to Dwight P. Robinson & Co., which already has large construction work under way for the Brazilian Government in Northeastern Brazil. Representatives of the company and of Frank L. Packard, Architect, of Columbus, who will design the building, sailed recently for Brazil to begin the work at once.

The exposition will open at Rio de Janeiro on September 7th, and will commemorate 100 years of Brazilian independence.

It was recently announced at the White House that the American building would be of permanent construction and so designed as to permit of its being converted into an embassy for this country's diplomatic representative after the close of the exposition.

J. H. Whitehouse, for twenty-seven years the superintendent of the Springfield Glazed Paper Company, has been retired, his place to be taken by Frank Yelinek.

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## Papermaking Rags

Trade activity in papermaking rags has shown some improvement in January following the slack holiday period, yet the market is still far from a normal position in respect to the amount of rags moving into consuming channels. Paper manufacturers continue to buy chiefly to cover immediate requirements, and with most mills running at curtailed production, the need for rags has not been of usual volume. Moreover, demand has been centered on certain grades, which has been creative of fair activity and an uptrend in prices on these grades, whereas other kinds of rags have been largely neglected, thus making for a rather spotty market situation.

The future position of papermaking rags seems to depend entirely on demand. If operations in the paper industry increase to a point where papermakers will find it necessary to materially broaden their buying of rags and other raw material, the probabilities are some sharp advances in rag prices will occur, because there is no question that a more or less scarcity of some grades of rags exists at present. This scarcity is not severe enough to have important influence on values unless demand from consuming sources expands considerably, and should mills continue buying in about their current volume, or even in little larger amounts, there should be no material rise in prices. Collections of rags the country over have been light during recent months, this being partly due to the high cost of such operations as well as to the rather low prices that have been obtainable from paper mills for rags. The result is that, from all indications, accumulations of rags suitable for papermaking are comparatively small in this country at present, and it would therefore require no great broadening of demand to prompt packers and dealers to mark up prices. On the other hand, increased demand and higher prices would doubtless attract larger importations from European sources, which might serve to keep domestic prices from advancing to any important extent. It is generally conceded that Europe has considerable supplies of papermaking rags and that dealers on the Continent are merely waiting for a favorable market to develop before shipping out stock and that they are looking particularly toward the United States as an outlet for their supplies.

In new cuttings the situation would seem to be working into a slightly more favorable position for paper manufacturers. For a long time cuttings have been in relatively light supply owing to the slow operations in clothing manufacturing establishments, and dealers have been enabled to hold out for rather high prices, but now that clothing houses are increasing their production more rags are becoming available and dealers in at least some cases are somewhat pressed to move stocks to make room for incoming supplies. Prices on new cuttings during the next several months will likely depend entirely on the amount of buying that papermakers engage in.

Roofing rags have continued to strengthen in price under a proportionately larger movement toward mills than any other class of rags. In the East 1.20 cents a pound has been paid for No. 1 roofing stock, f. o. b. New York, and 1.05 cents and higher for No. 2 packing. Even higher prices prevail in the West, 1.40 cents having been obtained from felt mills for No. 1 roofing, and 1.30 cents for No. 2 packing. Old whites display a firming tendency, but thirds and blues have been neglected by most consumers and quotations on these rags are rather soft.

Prices on a majority of grades of new cuttings have receded slightly, though No. 1 white shirt cuttings hold steady at 9.50 to 10 cents per pound. Washables and fancy shirt cuttings are said to be difficult to sell to fine paper mills owing to the German dyes now in these rags, which make it hard to bleach them satisfactorily. White lawns and muslins are in fair demand. Average quotations f. o. b. shipping points follow:

| New Stock— | New York and Chicago |
|---|---|
| White shirt cuttings, No. 1 | 9.50-10.00 |
| White shirt cuttings, No. 2 | 5.50- 6.00 |
| Fancy shirt cuttings | 5.50- 5.75 |
| Washables, No. 1 | 3.50- 3.75 |
| Unbleached muslins | 8.50- 8.75 |
| White lawns | 8.25- 8.50 |
| Overall cuttings, blue | 6.00- 6.25 |
| Black silesias | 3.00- 3.25 |
| Old Stock— | |
| Whites, No. 1 repacked | 5.00- 5.50 |
| Whites, No. 2 repacked | 3.25- 3.75 |
| Whites, house soiled | 1.60- 1.80 |
| Whites, street soiled | 1.40- 1.60 |
| Lace curtains | 4.00- 4.25 |
| Thirds and blues, rough | 1.25- 1.40 |
| Thirds and blues, repacked | 1.75- 2.00 |
| Black stockings | 2.00- 2.25 |
| Cotton canvas, No. 1 | 3.50- 3.75 |
| White cotton batting | 1.75- 2.00 |
| Roofing, No. 1 | 1.20- 1.40 |
| Roofing, No. 2 | 1.05- 1.30 |

## Rope and Bagging

After ruling firm in price for a lengthy period, old rope suitable for papermaking has finally eased off somewhat in price. This apparently has been due in part to the increase in importations of old rope from Europe which have enabled consumers in this country to cover their requirements for a time and thus accomplish a reduction in price. Sales of No. 1 manila rope have been recorded at 4.25 to 4.50 cents per pound at dealers' shipping points, and it is stated that the probabilities are in favor of buyers effecting some purchases at even a shade below this quotational range. Indications are that old rope supplies are still under normal in the United States. Shipbuilding operations and mining activities have been on such a reduced scale for some months that less old rope has been produced, yet in spite of the low visible domestic supply sufficient rope has been imported lately to weaken the price position. Old mixed strings are in fair demand and steady in price at around 90 cents per hundred pounds at dealers' shipping points.

There is little trade activity in old bagging. Tissue paper mills are absorbing small supplies as needed from those dealers to whom they look regularly for bagging, but there is practically no outside buying and stocks of bagging are more than ample to cover present requirements. Prices are mainly nominal.

Quotations f. o. b. shipping points are:

| | New York and Chicago |
|---|---|
| Gunny, No. 1 domestic | 1.00-1.15 |
| Gunny, No. 1 foreign | .90-1.10 |
| Scrap bagging, No. 1 | .90-1.00 |
| Roofing bagging | .65- .75 |
| Wool tares, heavy | 1.50-1.75 |
| Wool tares, light | 1.25-1.50 |
| Manila rope, No. 1 foreign | 4.00-4.25 |
| Manila rope, No. 1 domestic | 4.25-4.50 |
| Sisal strings | 1.50-1.75 |
| Mixed strings | .85- .95 |

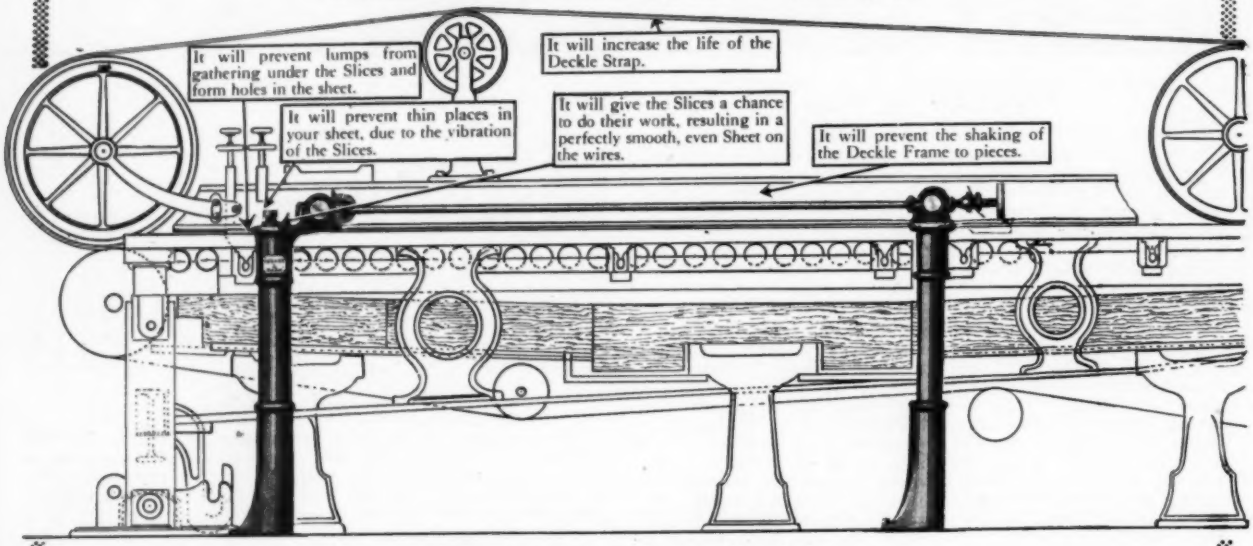
## Old Papers

The market for old paper has been moderately active. Book, hanging, wrapping and other paper mills and board manufacturers have operated fairly heavily as buyers, and prices have moved to higher levels under the stimulation of an improved demand. From all accounts, the rise in prices has been due more to light supplies of most grades of waste paper than to any pressing demand from consuming quarters, though it must be said that buyers have aided in the general improvement of the situation. It cannot be denied that some kinds of old paper are in decidedly limited supply. This is due mainly to the slow operations of print shops and other producing plants, and also to curtailed collections from office buildings and residential sections because of the unprofitable prices that prevailed for a time on those grades of waste paper chiefly obtained from these sources. With prices now on a higher level collections should be stimulated and supplies increased, although dealers in frequent instances assert that they fail to find larger amounts of old paper available even when they go out to look for it.

Prices on some of the high grades of waste paper are at a

# The Acme Deckle Frame Support

***"is indispensable to the making of Good paper"***


It will prevent lumps from gathering under the Slices and form holes in the sheet.
It will increase the life of the Deckle Strap.
It will prevent thin places in your sheet, due to the vibration of the Slices.
It will give the Slices a chance to do their work, resulting in a perfectly smooth, even Sheet on the wires.
It will prevent the shaking of the Deckle Frame to pieces.

***It will make better edge, save breaks and take less power.***

***Manufactured and Distributed by***

**HUBAND & NASH**

**Menasha, Wis.**

***Most of the best mills in this country are equipped with this device.***

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## FOURDRINIER WIRES

**"In all widths up to and including 250 inches"**

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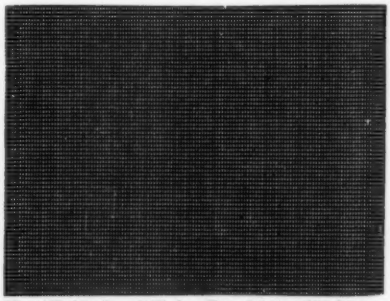
Tyler Fourdrinier Wires are dependable, reliable and durable.

The secret of durability is found in the special composition metal that is used in the make-up of the wire, and by reason of its substantial construction a long life with a large tonnage is assured.

Tyler Wires run straight with no inclination of becoming slack at the edges.

Prices and samples will be mailed upon request.



**The "Tyler Special" for Fourdrinier Machines**

## THE W. S. TYLER COMPANY

CLEVELAND, OHIO

height within close proximity to ruling quotations on wood pulp, and this argument is being used by buyers against any further rise in old paper costs. It should be remembered, however, that there are some paper and board mills unaccustomed to using pulp and which will doubtless stick to paper stock, and with supplies of the latter limited, it stands to reason that high prices must be paid by consumers if they expect to acquire necessary supplies. Soft white shavings have been in especially good demand and quotations on this grade have mounted to where dealers insist on at least 3.25 cents per pound at shipping points, with many unwilling to accept orders at less than 3.50 cents. Hard white shavings are relatively in less demand but are firmly quoted at 3.90 to 4.15 cents a pound. Old books and magazines are freely sought by consuming mills and dealers quote from 1.50 to 1.65 cents a pound at shipping points, representing a considerable advance. Old No. 1 kraft paper is firm at 1.85 to 2 cents per pound, and white blank news cuttings at 1.80 to 2 cents. Folded newspapers are selling at a range of 60 to 70 cents a hundred pounds, and No. 1 mixed paper at 45 to 55 cents, with the market for these low grades higher in the Middle West than in the East.

Quotations f. o. b. shipping points are as follows:

| | New York and Chicago |
|---|---|
| Hard white shavings, No. 1 | 3.90-4.15 |
| Hard white shavings, Nos. 2-3 | 2.75-3.25 |
| Soft white shavings | 3.25-3.50 |
| Colored shavings | 1.50-1.75 |
| Heavy book, No. 1 | 1.50-1.65 |
| Crumpled book, No. 1 | 1.10-1.20 |
| Ledger stock | 1.75-1.85 |
| Kraft, No. 1 | 1.85-2.00 |
| Manilas, No. 1 | .90-1.00 |
| White blank news | 1.80-2.00 |
| Overissue news, No. 1 | .80- .90 |
| Folded news | .60- .70 |
| Mill wrappers | .70- .80 |
| Box board cuttings | .55- .65 |
| Mixed paper, No. 1 | .45- .55 |
| Common paper | .30- .40 |

## Chemical Pulp

Developments of note have been lacking in the domestic wood pulp market, yet the situation is steady, if not firm, and there is a fair volume of business current in pulp. Paper mills are buying pulp at present almost solely to satisfy direct requirements, and while supplies continue to move on contract in a moderately regular way and in considerable tonnage, spot demand lacks the volume that is a feature in busier times. Most paper manufacturers seem confident that there are ample supplies of pulp to serve their purposes and that there is small likelihood of prices rising to any material extent, with the result producers are experiencing no little difficulty in inducing them to buy unless actually and immediately in need of additional supplies. At the same time, signs point to most pulp manufacturers having the bulk of their present output sold on contract, and to such supplies as are held unsold being in firm hands, with the result prices are characterized by much strength and very little selling pressure is in evidence. An argument against lower pulp prices is that pulp producers are now operating at a loss, or at least are merely breaking even on their current output, because of the high-priced wood they are using, and it is contended that no cheaper pulp prices can be expected until mill stocks of wood bought at peak market levels a year or so ago are used up.

News grade sulphite is moving in fair tonnage and at steady prices of around 2.65 cents per pound at pulp mills. Leading domestic producers of No. 1 bleached sulphite are quoting 5 to 5.25 cents a pound, and easy bleaching sulphite is bringing about 3.25 cents. Kraft pulp is firm at 2.75 to 3 cents, with strictly No. 1 quality kraft readily commanding the higher figure, and soda pulp is selling at 4 to 4.25 cents per pound.

F. o. b. pulp mill quotations follow:

| | |
|---|---|
| Bleached sulphite | 5.00-5.25 |
| Easy bleaching sulphite | 3.25-3.50 |
| Unbleached sulphite, No. 1 | 2.75-3.00 |
| News grade sulphite | 2.50-2.75 |
| Soda pulp, bleached | 4.00-4.25 |
| Mitscherlich, unbleached | 3.50-3.75 |
| Kraft, No. 1 | 2.75-3.00 |
| Screenings, refined | .80-1.00 |

## Mechanical Pulp

Mechanical wood pulp is in comparatively good demand and quotations show a hardening tendency. Consumers, while buying cautiously and mainly to cover actual requirements, are coming more and more into view, and the very character

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**Cast Bronze Screen Plate**
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Specialty Paper Mills, Ltd., Camden East, Ontario
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Kraft Pulp 50 tons daily

*Our pulp is made from Canadian Spruce*
*We ship in sheets, baled*

BATHURST, NEW BRUNSWICK, CANADA

of the demand gives the situation a healthy undertone, there being quite a variety of buyers in evidence. News print mills are absorbing ground wood in good volume, and demand from hanging paper plants is steady and on the increase, while board manufacturers are lending considerable support to the market after having operated as buyers on a limited scale for a time.

There are several bullish factors in the market. The rising demand is, of course, one of these, and another is that the current production of ground wood is not up to normal, while stocks seem to be gradually declining. This causes sellers to be somewhat independent in their attitude in respect to quotations and makes them insistent on full asked prices. Another important factor is that ground wood at Scandinavian sources has advanced substantially in price, producers on the other side of the Atlantic asking figures which importers here assert they are unable to meet and compete with domestic and Canadian grinders, with the result less mechanical pulp is being imported.

Around $33 a ton at producing plants, or in the vicinity of $40 to $43 delivered consuming points, is the average quoted by domestic grinders on prime spruce ground wood for prompt shipment. Some spot lots of foreign ground wood are being sold now and then at about $33 to $34 per ton ex-dock New York or other Atlantic ports, but importers say they must obtain $38 or more in order to make a profit on fresh importations from Scandinavia.

## Chemicals

Current business in papermaking chemicals of most kinds is principally of the small-lot variety. Consumers are coming into view as buyers only when immediately in want of supplies and even then are placing orders for limited quantities for prompt shipment. Goods are moving on contract in regular fashion and it is this branch of the trade which shows the chief activity. Quotations, while holding steady in some cases, show a downward trend in others, as follows:

| | |
|---|---|
| Alum, lump ammonia | 3.50- 3.75 |
| Alum, lump starch | 4.00- 4.25 |
| Blanc fixe, powdered | 3.25- 3.50 |
| Bleaching powder (domestic drums) | 2.00- 2.50 |
| Brimstone (ton) | 16.00-17.50 |
| Casein | 8.00- 9.00 |
| Caustic soda, spot delivery | 3.50- 3.75 |
| China clay, domestic washed | 8.00-10.00 |
| China clay, foreign | 13.00-18.00 |
| Rosin, grade E | 5.45- |
| Satin white | 2.00- 2.25 |
| Soda ash, 58 per cent light (bags) | 1.75- 2.00 |
| Sulphite of alumina, commercial grade | 1.50- 1.75 |
| Starch, papermakers', in bags | 1.95- 2.00 |
| Talc (ton) | 11.00-12.00 |

### Growth of Kraft Paper Industry in United States

The first kraft pulp mill on the American continent was established in Canada in 1909, with a capacity of 60 tons daily. In 1922 the total rated capacity of thirty-six Canadian and United States mills will be 2,025 tons daily, and the increase through the twelve years since the first kraft mill was established has been evident every year. The gradual growth is shown by a table given in a bulletin of the American Paper and Pulp Association to its members.

The figures show that while Canada had the first kraft mill and maintained its lead in capacity for three years, the United States has since 1913 retained its leadership over its northern neighbor. The difference has at no time, however, been large, though the United States has apparently increased its capacity by building additional mills, while the Canadian increase has been through larger capacity in established mills. The United States in 1922 will have 25 mills making 1,199 tons daily, while Canada's eleven mills can make 826 tons.

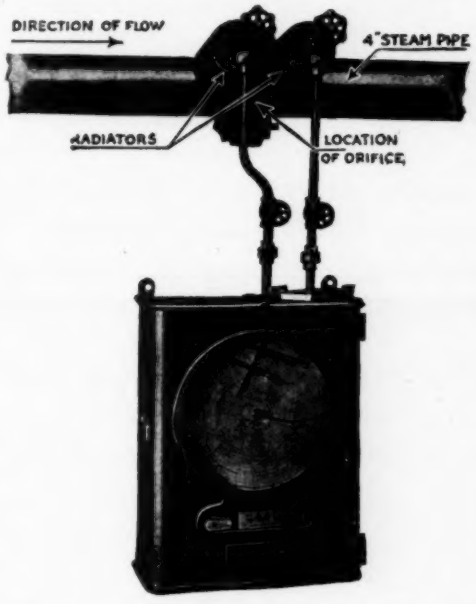
The production and importation of kraft pulp into the United States for the year 1920 was 345,000 tons. With a capacity of 1,200 tons daily, United States mills should be able to produce 300,000 tons annually operating only 250 days of the year, indicating that there is no real necessity for importation.

---

At the annual meeting of the Wausau Sulphate Fibre Company held at Wausau, Wis., January 16th, the following officers and directors were re-elected:

F. P. Stone, president; O. Bache-Wing, vice-president and general manager; L. Dessert, vice-president; A. L. Kreutzer, treasurer; G. D. Jones, secretary; N. S. Stone, assistant secretary-treasurer; Karl Mathie, chairman of board of directors; M. C. Ewing, John Ross and H. M. Thompson, directors.


# Bailey Fluid Meter




## PRACTICAL — ACCURATE

This shows the Bailey Fluid Meter complete for the measurement of steam. It consists of the Monel metal orifice installed between a pair of flanges, radiators and valves tapped into the pipe on the inlet and outlet sides of the orifice and pipes connecting these to the recorder.

Bailey Fluid Meters are easily and cheaply installed as changes in piping are not required and the accuracy is guaranteed.

They are the most practical and satisfactory meters for recording and integrating the flow of steam to turbines, digesters, paper machines and other processes. Steam can be measured at any pressure and temperature, exhaust steam included.

Either pressure or temperature recorders, or both, may be added to record on the same chart as the rate of flow.

Our engineering department is ready to suggest the proper equipment for your service.

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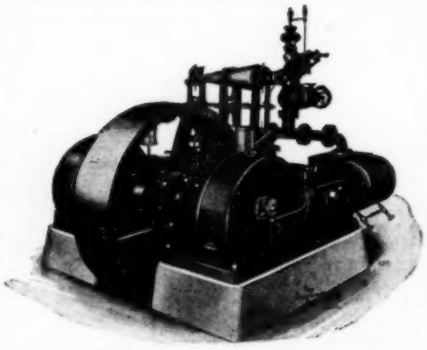

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***Bulletin E-4 gives a detailed description of this engine.***

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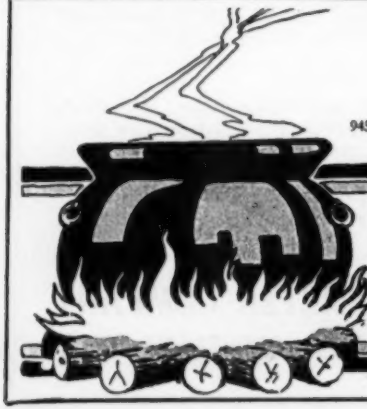

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| | |
|---|---|
| Writing— | |
| White rag | 15-40 |
| White sulphite, No. 1 | 10-20 |
| Colored | 12-40 |
| Ledger— | |
| White rag | 15-50 |
| White sulphite | 12-25 |
| Colored sulphite | 10-00 |
| Colored rag | 10-00 |
| Bonds— | |
| White rag | 13-40 |
| White sulphite | 9-20 |
| Colored sulphite | 10-25 |
| Colored rag | 14-40 |
| Book— | |
| No. 1 S. & S. C. | 6.50- 7.00 |
| Machine finished | 6.00- 6.50 |
| English finished | 6.25- 6.75 |
| Coated and enameled | 8.25- 9.00 |
| Lithograph, M. F. | 9.50-12.00 |
| Newsprint— | |
| Rolls, contract | 3.50- |
| Rolls, transient | 3.75- 4.00 |
| Sheets | 4.00- 4.25 |
| Side runs | 3.25- 3.50 |
| Cover Stock— | |
| Coated, both sides | 9.25- |
| Coated, one side | 9.20- |
| Tissue— | |
| No. 1 white, 20x30 | .90- 1.10 |
| No. 2 white, 24x36 | .80- .90 |
| No. 1 manila, 24x36 | .80- .90 |
| Kraft | .90- 1.15 |
| Wrappings— | |
| No. 1 kraft | 7.00- 7.50 |
| No. 2 kraft | 6.00- 6.50 |
| Boards— | |
| | New York and Chicago |
| Solid news | 42.50-45.00 |
| Straw | 45.00-50.00 |
| Plain chip | 37.50-40.00 |
| White coated chip | 60.00-70.00 |
| Manila coated chip | 55.00-60.00 |
| Binders' board | 70.00-80.00 |

## Snell Bill Hearing

When the recent hearing on the Snell bill closed before the House Committee on Agriculture, the paper industry of the United States had scored a notable success in its campaign to protect the source of its raw material.

The hearing was the most complete ever given the forestry problem by a congressional committee, and four solid days of discussion were devoted to this question. While the major portion of the time was given to witnesses representing the lumber industry, the whole hearing was organized, conducted and directed by the progressive paper manufacturers who began two years ago to campaign for a permanent national forest policy. The testimony throughout the hearing was conclusive on the need for the vital principle of co-operation between private owner, and the state, with federal leadership inspiration and co-ordination. Three days were devoted to the discussion of this and other features of the policy laid down by the Snell bill, and only a few speakers appeared against this principle of co-operation.

Gifford Pinchot appeared to advocate his plan of direct federal control of private timberland operations, which means the overriding of state forestry departments, and John H. Kirby, representing the southern pine manufacturers declared his firm belief that the government should in no way endeavor to regulate private handling of private property, and was therefore opposed to any forestry legislation of a federal nature.

The paper industry was represented by George W. Sisson, Jr., former president of the American Paper and Pulp Association, during whose period in office the Snell bill campaign was developed by the Forestry committee of that association. He showed the progressive character of the paper industry, by his statement that this industry was already doing more to solve the forestry problem than any other industry, and was conducting extensive reforestation operations, as well as handling its present lands in a scientific manner. The organization of the entire hearing was in the hands of R. S. Kellogg, secretary of the News Print Service Bureau.

## Pulp and Paper Course for Mill Men

In response to a popular demand the New York State College of Forestry is offering, this spring, a short course of instruction in the elementary principles of pulp and paper manufacture. The course is designed to benefit mill men who have not had any technical training, but who have had sufficient experience in the industry to understand the practical operation of pulp and paper mills. The object of the course is to give such men a specific knowledge of the principles which govern the mill operation, to acquaint them with processes of pulp and paper manufacture with which they have not had actual experience, and to broaden their perspective of the industry by giving them an opportunity to meet and talk with prominent men in many of its more important branches.

The instruction in the short course will consist of lectures by members of the College of Forestry faculty, experimental work in the college laboratories; talks on the principal operations by specialists in each of these fields and inspection trips to nearby mills.

Applications for admission to the course should be made in writing and forwarded to the college as soon as possible, each application being accompanied by statements showing that the candidate meets the necessary educational experience requirements. It will be necessary to restrict the size of the class to a limited number of men and the college reserves the right to refuse all applications for admission when the class quota has been filled.

Registration for the course will take place on Wednesday, March 1, 1922. Class work will be in order until March 29, and this will be followed by the inspection trip of three days, the itinerary of the trip being arranged so that it will be unnecessary for students living east of Syracuse to return to the college after the trip. Applications for admission to the course or letters for special information concerning it should be addressed to Prof. C. E. Libby, New York State College of Forestry, Syracuse, N. Y.

## Will Be a Representative Exposition

Applications for space at the Boston Graphic Arts Exposition which will be held in Boston, August 28 to September 2, 1922, in conjunction with the Third Annual Convention of the International Association of Printing House Craftsmen, bear out the fact that this Exposition will far surpass any previous undertaking of this nature and that the exhibitors will be representative in every respect.

Practically all of the leading manufacturers and supply houses of the entire country have sent in their applications for space. Printing press manufacturers, type concerns, machine composing firms, paper manufacturers, folding machine manufacturers, and all other lines, too numerous to mention, will be represented.

Indeed, the visitor to this Exposition will find every known machine and device in working operation and will secure an intimate and definite knowledge of everything that pertains to the printing industry.

Space applications at this writing have greatly exceeded even the fondest expectations of the Boston management and each mail brings in many additional ones. It is only a matter of a very short time when the entire space available will be completely sold out.

Attendance at the Boston Graphic Arts Exposition will also far surpass any previous show and the enthusiasm that is being shown throughout the entire country warrants the statement that between 100,000 and 200,000 Craftsmen, printers and those interested in the printing industry, will pass through the doors of Mechanics Building during the week of August 28 to September 2, 1922.

## Rosin of Uniform Quality

Far sighted paper manufacturers recognize the fact that rosin of uniform quality and standard grades allows them to improve their products by eliminating the necessity of making changes in processes and formulas to suit varieties of the rosins they use.

Yaryan wood rosin is produced under rigid chemical control. It is free from impurities, and is uniform in quality.

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Will YOU let us show YOU how to make MONEY by making a

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New York Boston Baltimore Pittsburgh Salt Lake City San Francisco

## Wood Pulp

Probably the most important development in the foreign wood pulp situation is that Germany has placed restrictions on the exportation of pulp from that country. Just how severe these restrictions are has not yet been learned on this side, but advices received from representatives in Germany by pulp importers in New York say that the restrictions imposed will very materially limit the tonnage of sulphite that will be permitted to leave Germany. The effect of this has been to further strengthen the tone of prices on foreign pulps in the United States. There has been no rise in prices of any moment, but importers are distinctly stronger in their attitude concerning quotations and the situation generally has taken on a firmer complexion.

Authoritative informants say that the campaign against the alleged dumping of wood pulp into the United States by European producers has been brought practically to a close. The United States Government officials who had charge of this matter and who for some months past have required pulp importers to put up bonds on nearly every shipment of pulp brought into the country from Europe are understood in quite a few instances to have refunded these bonds and to be letting up to no small degree in enforcing the regulations relative to anti-dumping. This is said to be the direct result of the overtures that have been made by pulp importers to the Washington authorities and the proof which importers have submitted to show that pulp is not being dumped onto the American market by European producers.

On the whole there has been moderate activity in the foreign pulp trade during the last month. Papermakers as a rule are still buying in very much the same manner as characterized their purchasing operations just prior to and during the holiday period, and yet reports say that fair amounts of imported pulp are being absorbed. Importations at New York during January were of smaller volume than during the several preceding months, but this is rather usual for the first month of the year owing to the fact that the Baltic begins to freeze over during the last part of December, thus putting a stop to water shipments from the east coast of Sweden. Ordinarily, and the same was true this season, the Swedes ship out all of the pulp they can manage to get away during the several weeks preceding the Baltic's closing, which accounts for the comparative heavy shipments to the American market along about the end of November and the first half of December.

Prices on most grades of imported pulp have shown a tendency to harden. This has been chiefly due to the strengthening of quotations from primary sources, where it is understood from most accounts that stocks have been very nearly depleted by manufacturers and where demand from various consuming sources has expanded sufficiently in recent months to cause producers to be more or less independent in their attitude regarding prices. Importers in New York say that they cannot begin to replace, at profitable prices, such lots of pulp as they happen to have in this country, which of course prompts them to be firm in their demands for full quoted prices on supplies they hold unsold here.

Foreign bleached sulphite is quoted at 4.25 to 4.50 cents a pound on the dock or ex-warehouse for strictly No. 1 quality sulphite, with secondary grades available to paper mills at a quarter to a half cent cheaper. Foreign easy bleaching sulphite is firm at 3 to 3.25 cents per pound, while foreign Mitscherlich sulphite is quoted at around 3 cents a pound. Scandinavian kraft pulp is steady at 2.75 to 3 cents per pound. Foreign ground wood is becoming increasingly scarce on the spot because importers are bringing very little supply in, producers in Scandinavia and Finland wanting prices beyond competing levels of domestic grinders. Some spot lots are selling now and then at $34 to $35 per ton ex-dock New York, but importers say they must obtain $38 or more for ground wood for shipment from primary European sources.

Receipts at the port of New York in January and current market quotations follow:

| | |
|---|---|
| Bleached sulphite, No. 1 | $ 4.25- 4.50 |
| Unbleached sulphite, No. 1 | 2.65- 3.00 |
| Easy bleaching | 3.15- 3.35 |
| Mitscherlich unbleached | 3.00- 3.25 |
| Kraft | 2.75- 3.00 |
| Ground wool, per ton | 34.00- |

Whalen Pulp and Paper Mills, 5,600 bls. from Alice, B. C.; National Bank of Commerce, 1,235 bls. from Hamburg; E. M. Sergeant & Co., 700 bls. from Hamburg and 400 bls. from Christiania; Woodpulp Trading Co., 681 bls. from Gothenburg; Scandinavian-American Trading Co., 2,411 bls. from Gothenburg and 1,169 bls. from Copenhagen; Guaranty Trust Co., 373 bls. from Hamburg; Castle, Gottheil & Overton, 549 bls. from Rotterdam and 2,125 bls. from Hamburg; United States Lines, 3,250 bls. from Bremen; Tidewater Paper Mill Co., 15,000 bls. from Salsbruget; American Woodpulp Corp., 1,055 bls. from Bremen; Poland Paper Co., 1,250 bls. from Christiania; J. Andersen & Co., 1,500 bls. from Christiania; Fred Enders & Co., 277 bls. from Hamburg; Ladenburg, Thalman & Co., 450 bls. from Hamburg; Order, 6,398 bls. from Vancouver, 5,499 bls. from Hamburg, 343 bls. from Copenhagen and 3,000 bls. from Sundsvall.

## Paper Stock

Imports of papermaking materials into the United States in January were probably smaller than in several months, if the receipts at the port of New York can be taken as an indication. This is doubtless the result of the slow period experienced by paper manufacturers toward the close of 1921 and during the first several weeks of the new year, which of course kept consumers out of the market as buyers of rags, rope and other paper stock and led to a reduction in shipments from European countries to the American market.

There were moderate lots of old rope received last month, and some fair-sized shipments of rags came in also. Bagging receipts were light and there were but small amounts of miscellaneous paper stock received. Arrivals through the port of New York in January follow:

### Old Rope

E. J. Keller Co., 88 coils from Bristol, 54 coils from Bremen and 336 bls. from Rotterdam; Brown Bros. & Co., 386 coils from Bristol, 57 coils from Glasgow and 1,035 coils from Hull; R. F. Downing & Co., 60 bls. from London and 57 bls. from Barcelona; J. Hughes, 48 coils from Glasgow; First National Bank of Boston, 64 coils from Gothenburg and 264 coils from Antwerp; Equitable Trust Co., 72 coils from Rotterdam; W. Schall & Co., 78 bls. from Barcelona; Atlantic National Bank, 105 coils from Marseilles; Cleveland-Akron Bag Co., 145 coils from Bristol and 200 coils from Leith; Mechanics & Metals National Bank, 126 coils from Hamburg; Ladenburg, Thalman & Co., 275 bls. from Havre; International Purchasing Co., 70 bls. from Havre; Irving National Bank, 115 bls. from Copenhagen.

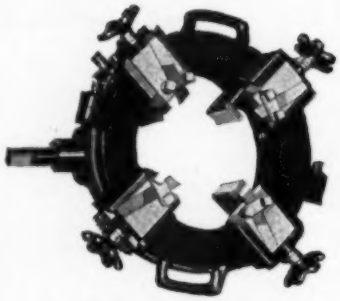
### Old Bagging

E. Butterworth & Co., 125 bls. from Antwerp; Irving National Bank, 189 bls. from Manchester; Mechanics & Metals National Bank, 37 bls. from Manchester and 112 bls. from Antwerp; E. J. Keller Co., 215 bls. from Hamburg, 362 bls. from Manchester and 61 bls. from Rotterdam; Castle, Gottheil & Overton, 74 bls. from Havre; Equitable Trust Co., 160 bls. from Manchester; Order, 232 bls. from Antwerp and 400 bls. from Manchester.

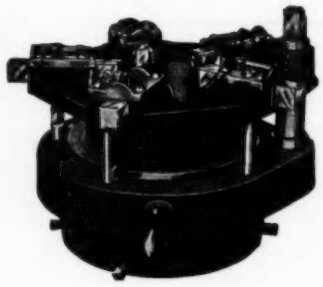
### Rags

Guaranty Trust Co., 249 bls. from Hamburg and 89 bls. from Antwerp; E. J. Keller Co., 465 bls. from Hamburg, 509 bls. from Rotterdam, 51 bls. from Havre, 188 bls. from Stockholm and 206 bls. from Marseilles; Bankers Trust Co., 1,063 bls. from Hamburg; Maurice O'Meara Co., 768 bls. from Hamburg; Irving National Bank, 220 bls. from Hamburg and 566 bls. from Havre; American Woodpulp Corp., 464 bls. from Hamburg and 123 bls. from Bremen; National City Bank, 95 bls. from Hamburg; Central National Savings Bank & Trust Co., 24 bls. from Hamburg; Ladenburg, Thalman & Co., 1682 bls. from Hamburg, 379 bls. from Bremen and 258 bls. from Havre; Mechanics & Metals National Bank, 155 bls. from London, 312 bls. from Brement and 180 bls. from Hamburg; F. P. Gaskell & Co., 147 bls. from Hamburg and 164 bls. from Bremen; Arrowhead Mills, 47 bls.

# The "TOLEDO" Line of Geared Pipe Tools



WHERE fast, accurate, heavy duty pipe threading and cutting must be done, your pipe house can be equipped with no better tools than the famous "Toledo" line. They offer everything to be desired—portability, capacity, ease of operation and durability. Additions or replacements in your pipe tools should not be made until you have fully investigated the complete "Toledo" line. Send for new catalog "F."



## "Toledo" Geared Pipe Cutters

These popular geared cutters have a capacity of 2½" to 6" in one model, and 7" to 10". in the largest model. Fitted with knife cutters. Are portable. Can be split to encircle pipe already installed. Severs pipe quickly leaving clean, square end without burr. One man can operate them with ratchet handle. Their greatest speed and efficiency can be gained by use of our Power Drive.

## "Toledo" Power Drive for Geared Pipe Tools

Used instead of ratchet handle. Attaches and detaches just the same. Operates threaders and cutters five times faster than by hand. Send for bulletin.

## "Toledo" Geared Threading Devices

Four models comprise the "Toledo" line of geared Pipe Threading Devices. The combined capacity ranges from 2½" to 12" pipe inclusive. They are conceded by leading pipe fitting contractors to be the most efficient threading devices on the market today. One man can operate any model, including largest size. Are portable. Cut true, clean, accurate threads. Operated with ratchet handle or with "Toledo" Power Drive.

New York Office
50 Church Street
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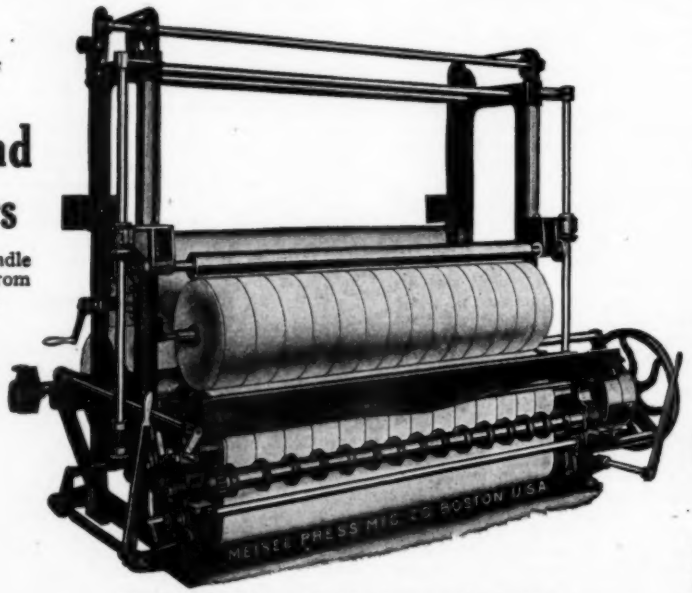
**The Toledo Pipe Threading Machine Co.** **Toledo, Ohio**

*Manufacturers of*

# Slitters and Rewinders

Any width, to handle any weight paper from tissue to cardboard.

Rolls up to 40 inches in diameter




Series OM Medium Weight Slitter and Rewinder

*Manufacturers of*

# Adjustable Sheet Cutters

for tissue, waxed and other papers.

# Rotary or Bed and Platen Presses

for printing all classes of paper, tissue to cardboard.

# MEISEL PRESS MANUFACTURING CO.

948 Dorchester Ave., Boston 25, Mass.

from Bremen; Chemical National Bank, 177 bls. from Bremen; Castle, Gottheil & Overton, 220 bls. from Bremen, 383 bls. from Antwerp and 229 bls. from Havre; Katzenstein & Keene, 233 bls. from Antwerp; Albion Trading Co., 16 bls. from Hamburg and 53 bls. from Liverpool; J. J. Patricof Co., 965 bls. from Antwerp; George W. Millar & Co., 115 bls. from Rotterdam; American Express Co., 65 bls. from Liverpool; United States Lines, 3,204 bls. from Bremen; Barrett Co., 61 bls. from Manchester; Brown Bros. & Co., 798 bls. from Hamburg; O. G. Hempstead & Sons, 264 bls. from Hamburg; J. M. Jaffe, 82 bls. from Rotterdam; Order, 382 bls. from Hamburg and 87 bls. from Havre.

### Miscellaneous Paper Stock

Salomon Bros. & Co., 40 bls. from Manchester, 14 bls. from Liverpool and 217 bls. from Antwerp; Irving National Bank, 61 bls. from Antwerp; E. Butterworth & Co., 140 bls. from Belfast; American Exchange National Bank, 34 bls. from Manchester; Equitable Trust Co., 291 bls. from Dundee; Maurice O'Meara Co., 23 bls. from Dundee; Crane & Co., 45 bls. from Dundee.

## Paper

The United States' import trade in new paper developed no new features in January. Fair amounts of certain kinds of paper were received from foreign sources, although the aggregate tonnage imported was somewhat smaller than in the several preceding months, judging by the shipments received through the port of New York. Newsprint imports were comparatively large, totalling approximately 17,000 rolls at New York, while several sizable lots of wrapping paper and paper board were received. Imports of cigarette and hanging papers also were of about the usual volume.

Arrivals at the port of New York in January follow:

### Cigarette

American Tobacco Co., 226 cs. from Havre and 400 cs. from Bordeaux; C. B. Richard & Co., 10 cs. from Danzig; P. J. Schweitzer, 13 cs. from Marseilles; Surbrug Co., 35 cs. from Havre; Rose & Frank, Co., 198 cs. from Havre; J. Victori & Co., 4 cs. from Barcelona; Hard & Ritter, 5 cs. from Barcelona; R. J. Reynolds Tobacco Co., 240 cs. from Bordeaux; Atlantic Forwarding Co., 4 cs. from Hamburg; Order, 50 cs. from Marseilles, 50 cs. from Genoa and 10 cs. from Barcelona.

### Printing

Chemical National Bank, 535 rolls from Copenhagen, 240 rolls from Hamburg and 77 rolls from Bremen; Maurice O'Meara Co., 122 bls. from Antwerp and 51 rolls from Gothenburg; National Bank of Commerce, 724 rolls from Hamburg; Northern & Western Finance & Trading Corp., 59 bls. from Rotterdam; B. F. Drakenfeld & Co., 23 cs. from Liverpool; L. A. Consmiller, 50 cs. from Rotterdam; Wilkinson Bros. & Co., 68 rolls from Copenhagen; National City Bank, 552 rolls from Copenhagen; Equitable Trust Co., 111 rolls from Copenhagen; New York Tribune, 646 rolls from Christiania; Haring Paper Corp., 368 rolls from Christiania; Pattison & Co., 29 rolls from Christiania; A. Woltzan, 551 rolls from Christiania; Publishers' Buying Corp., 47 rolls from Christiania; Chase National Bank, 3,167 rolls from Hallstavik; Star Co., 4 rolls from Hallstavik; Gerhard & Hey, 18 rolls from Hamburg; Coyle & Grant, 12 cs. from Glasgow; American Express Co., 789 rolls from Sundsvall; Irving National Bank, 1,009 rolls from Sundsvall; American Woodpulp Corp., 301 rolls from Sundsvall; Central Union Trust Co., 185 rolls from Christiania; C. Fernstrom, 190 rolls from Christiania; C. E. Melby, 55 rolls from Christiania; Borregaard Co., 108 rolls from Gothenburg; C. K. McAlpine, 326 rolls from Gothenburg; Street & Smith Publishing Co., 339 rolls from Gothenburg; Atlantic National Bank, 78 rolls from Gothenburg; Parons & Whittemore, 62 rolls from Rotterdam; C. L. Robinson, 40 rolls from Gothenburg; Order, 2,029 rolls from Hallstavik, 514 rolls from Sundsvall, 338 rolls from Christiania, 782 rolls from Hamburg, 642 rolls from Bremen, 1,479 rolls from Gothenburg and 20 cs. from Antwerp.

### Wrapping

Republic Bag & Paper Co., 1,642 rolls from Hamburg and 103 rolls from Bremen; Ladenburg, Thalman & Co., 3,278 rolls from Hamburg; D. S. Walton & Co., 1,842 rolls from Hamburg; Equitable Trust Co., 238 rolls from Hamburg; Birn & Wachenheim, 27 rolls from Rotterdam and 18 cs. from Antwerp; New York Trust Co., 24 rolls from Copenhagen; J. P. Hefferman Paper Co., 141 bls. from Gothenburg; Coy, Hunt & Co., 305 bls. from Gothenburg; Arkell Safety Bag Co., 22 rolls from Gothenburg; Order, 1,684 bls. from Hamburg and 382 bls. from Copenhagen.

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ORVAR HYLIN, Vice President
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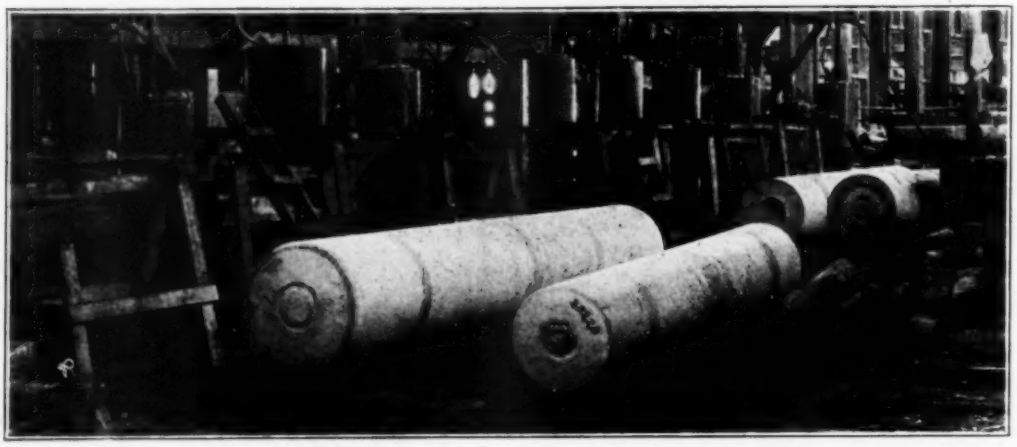
AND

Finnish Wood Pulp Union
Helsingfors, Finland

# BARRE GRANITE IN PRESS ROLLS

***Is Revolutionizing the Whole Paper Making Industry***

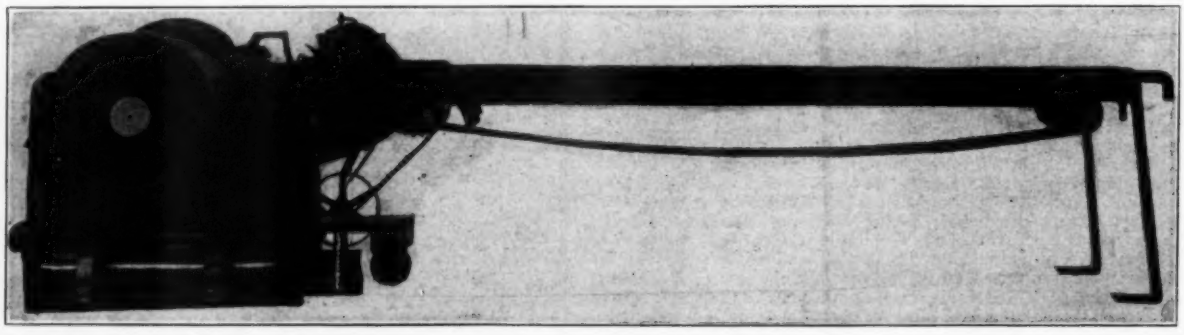


If your Paper Machines are not equipped with Press Rolls of BARRE GRANITE you are not getting the results that you should get, for it is a recognized fact that granite rolls are much superior to any others and Barre Granite the best of all. Let us tell you about them.

**Jones Brothers Company**

**BARRE, VT.** **BOSTON, MASS.**

# No. 11 "GIANT" PAPER STOCK CUTTER



***Capacity 2½ Tons Per Hour***

***Especially Adapted for Handling Waste Paper, Magazines, Etc., Before Feeding to the Beaters***

**Whatever You Cut, A GIANT Will Solve Your Problem**

**LET US FIGURE IT OUT FOR YOU**

**TAYLOR, STILES & COMPANY, Riegelsville, N. J., U.S.A.**

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Brantford, Ont., Canada
Canadian Representatives

R. J. MARX
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### Hanging

A. C. Dodman, Jr., 20 bls. from Antwerp and 14 bls. from Liverpool; Prager Co., 6,988 rolls from Antwerp; R. F. Downing & Co., 41 cs. from Yokohama and 23 bls. from London; A. Murphy & Co., 4 bls. from Liverpool and 4 bls. from London; W. H. S. Lloyd & Co., 89 bls. from London.

### Writing

Irving National Bank, 100 cs. from Antwerp; H. Bainbridge & Co., 3 cs. from London; Order, 11 cs. from Marseilles, 17 cs. from Antwerp and 17 cs. from Hamburg.

### Drawing

P. Puttmann, 43 cs. from Antwerp; Keuffel & Esser Co., 71 cs. from Hamburg; Leonhardt & Brush, 91 rolls from Hamburg; Lunham & Moore, 12 cs. from Rotterdam; E. Dietzgen & Co., 5 cs. from Hamburg.

### Filter

P. H. Petry & Co., 7 cs. from Gothenburg; A. Giese & Sons, 20 bls. from Hamburg; Lunham & Moore, 4 cs. from Rotterdam.

### Tissue

Boera Bros., 30 bls. from Valencia; A. P. O'Brien, 10 cs. from Hamburg; R. Hoe & Co., 6 bls. from London.

### Boards

Norris Export & Import Co., 3 cs. from Hamburg; Prager Co., 34 cs. from Hamburg and 9 cs. from Bremen; Davies, Turner & Co., 3 cs. from Hamburg; Bernard, Judae & Co., 5 cs. from Hamburg; Phoenix Shipping Co., 11 cs. from Hamburg; Andrews & Co., 2 cs. from Bremen; Happel & McAvoy, 2 cs. from Bremen; C. B. Richard & Co., 4 cs. from Bremen; Agar Bernson Corp., 23 bls. from Hamburg; Metropolitan Import & Mfg. Co., 56 cs. from Bremen and 4 cs. from Hamburg; A. Bourjois & Co., 4 cs. from Havre; International Forwarding Co., 11 cs. from Hamburg; Buschman Bros., 250 rolls from Rotterdam; Order, 2,513 bls. from Hamburg and 83 cs. from Rotterdam.

### Miscellaneous

J. W. Hampton, Jr., & Co., 7 cs. from Hamburg; T. D. Downing & Co., 6 cs. from Hamburg; Sussfield, Lorsch & Schimmel, 4 cs. from Havre; Defender Photo Supply Co., 40 cs. from Antwerp; Blauvelt Wiley Paper Mfg. Co., 2 bls. from Glasgow; Old Colony Trust Co., 22 cs. from Yokohama; P. C. Zuhle, 64 cs. from Rotterdam; Kaufman & Straus Co., 5 cs. from Hamburg; F. L. Kraemer & Co., 20 cs. from London; Favor, Ruhl & Co., 13 cs. from Havre; Atlantic Forwarding Co., 2 cs. from Havre; American Express Co., 10 bls. from Genoa; C. De Nobile Co., 30 bls. from Genoa; Kingston Mills Paper Co., 29 bls. from Gothenburg; Whiting-Patterson Co., 2 bls. from Gothenburg; Baldwin Universal Co., 10 cs. from Hamburg; P. Puttmann, 2 cs. from Antwerp; G. W. Sheldon & Co., 92 cs. from Bremen; H. Reeve Angel & Co., 90 bls. from Bremen; C. B. Richard & Co., 3 cs. from Hamburg; F. W. Devoe & Raynolds Co., 2 cs. from Havre; Phoenix Shipping Co., 2 cs. from Hamburg; A. Straus & Co., 5 cs. from Hamburg; Borden & Riley Paper Co., 8 cs. from Antwerp; Jones & Co., 16 rolls from London; Gruner & Reinhardt, 8 cs. from Hamburg; Baer Bros., 5 cs. from Bremen; Order, 14 cs. from Havre and 23 rolls from London.

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## New Pulverized Fuel Bulletin

A new bulletin on the Quigley Fuel Systems, comprising methods of preparing, transporting, and burning of pulverized fuels has just been published by the Hardinge Company, 120 Broadway, New York.

This bulletin is known as No. 12 and treats the subject of pulverized fuels in a manner never before attempted. One of its distinguishing features is the fact that emphasis is laid upon the methods employed to properly prepare and burn the powdered coal, rather than occupying most of the space discussing the pulverizer.

This bulletin comes at a very opportune moment, for burning of pulverized fuel has reached the stage in its development where its success is assured. It is now being specified by the largest power and heat engineers in the country as a solution to many problems involving the generation of heat.

---

The Dayton-Dowd Co., Quincy, Ill., announces the opening of a district office in Pittsburgh, at 809 Keenan Building, covering the sale of Centrifugal Pumps and Underwriters' Fire Pumps. The office will be in charge of T. J. Barry, who for the past several years has been connected with the home office on engineering and sales. Mr. Barry's equipment and experience fully qualify him to give the pump users of his district exact data on their pumping problems.

**Increased handling capacity at one-half the cost**

To double your handling capacity and at the same time cut the unit cost in half is certainly worth while. The Brownhoist locomotive crane shown above is doing this at the paper mills where it is working. This crane handles 85 thousand feet of timber per day at a cost of 70 cents per thousand. This is against 45 thousand feet at a cost of $1.48 per thousand under the former method.

In addition to the speed and low cost of upkeep of Brownhoist cranes their great flexibility should be considered. Practically all kinds of materials can be handled anywhere as Brownhoists are made to operate on traction wheels or creeper trucks as well as railroad trucks. And the saving of handling materials by locomotive crane is usually as great or greater than the above.

Catalog K shows many types of Brownhoist cranes working in different industries. If you have any handling problems you will be interested in seeing how some Brownhoist owners are solving theirs. Write us. The knowledge of 40 years of crane building is at your service.

**The Brown Hoisting Machinery Co.**
*Cleveland, Ohio*

Branch offices, New York, Pittsburgh, Chicago, San Francisco and New Orleans

BROWNHOIST

# Gibbs-Brower Bulletin

## Paper Mill for Quick Sale at Right Price to Close an Estate

Near Philadelphia, Pa., railroad siding, complete up-to-date Mill Buildings and equipment. Steel warehouse, barn, office, 50 acres of land with mill village of 23 houses.

76".Pusey and Jones. Fourdrinier trimming 68½"—Smith and Winchester Jordan—2 Umpherston beaters, 2 Downingtown washers—3 rotaries—Cranston cutter—drainers and 3 Heine boilers.

Mill run by steam with excellent water for manufacturing purposes.

Equipment adapted to making part rag papers, or wood specialties. 10,000 lbs. 24 hours. Price and terms upon application.

**GIBBS-BROWER COMPANY**

*Paper and Pulp Mill Brokers*

**261 BROADWAY** **NEW YORK CITY**

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# The Bayley B. T. U.

A complete self-contained heating and ventilating unit that distributes tempered air evenly throughout the room. It adapts itself readily to permanent or temporary heating requirements, is easily installed, requires no piping except supply and return from source of steam. Simply set on floor where wanted, connect steam and return piping, and wiring to motor and it's ready to run.

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**Bayley Manufacturing Co.**

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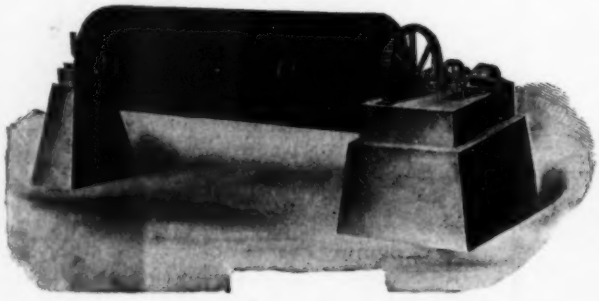
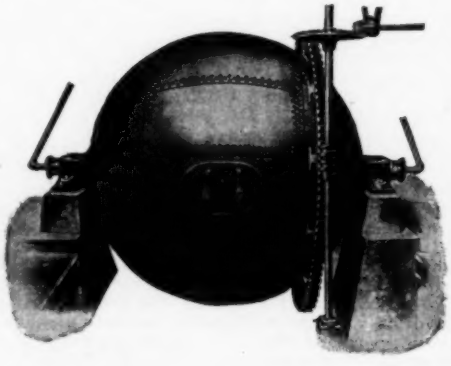
# BIGGS

## Globe and Cylinder Rotary Bleaching Boilers





Biggs Rotaries have been adopted as standard equipment since 1887. Let us figure on your next installation.

We specialize in Steel Storage and Pressure Tanks, and general steel plate construction for the paper trade.

## The Biggs Boiler Works Company

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